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The Coefficient of Expansion of Tar.[1]

[Prepared by MR. JOHN MORRIS WEISS.]

Coal tar and other tars are commercially bought and sold by the gallon and, as temperature plays an important part in liquid volume measurements, it is essential to know the effect of changes of temperature on volume. This knowledge is summed up in the coefficient of expansion. Now, coal tar from various sources varies considerably in composition and hence also in its expansion coefficient. In this paper are presented tests of various kinds of tar, along with their coefficients of expansion as determined in the laboratory.

The method of procedure was simple. The specific gravity of the tar was determined at various temperatures compared to water at the same temperature. A specific gravity bottle of 50 c.c. capacity, whose weight and water content at various temperatures were known, was filled ¾ full of tar and weighed. Then water was added, adjusted to the temperature desired and weighed.

a = weight of bottle.
b = weight of bottle + water at t°.
c = weight of bottle + tar.
d = weight of bottle + tar + water at t°.

$$\text{Specific gravity: } t°/t° = \frac{c-a}{(b-a)-(d-a)} = \frac{c-a}{(b+c)-(a+d)}$$

1. *Journal, Franklin Institute.*

From this figure the density, or a direct mass and volume relation, could be readily obtained by multiplying the specific gravity by the density of water at that temperature. This can be seen in the following formulæ:

Let D_t = density of tar at $t°$.
M = weight of given quantity of tar.
V = volume of that tar.
D_w = density of water at $t°$.
M_w = weight of an equal volume of water at $t°$.

The known equation is:

$$\text{Specific gravity: } t°/t° = \frac{M}{M_w}$$

Now

$$D_t = \frac{M}{V} \quad (1)$$

$$V = \frac{M_w}{D_w} \quad (2)$$

Substitute (2) in (1):

$$D_t = \frac{M}{\frac{M_w}{D_w}} = \frac{M}{M_w} \times D_w = \text{specific gravity of tar at } t° \times \text{density water at } t°.$$

Now in experiment the following figures were determined for a tar

at	a°	D
"	(a + b)°	D_1
"	(a + 2b)°	D_2

and assuming a constant mass

at	a°	V
"	(a + b)°	V_1
"	(a + 2b)°	V_2

a° and (a + 2b)° were the limits of temperature in which tar are usually measured and it was found that for all practical purposes

$$V_2 - V_1 = V_1 - V$$

or

$$\frac{V_2 - V_1}{b} = \frac{V_1 - V}{b} = \text{constant.}$$

Then if V is taken as unity the constant represents the amount 1 unit volume of tar will expand or contract for 1° change in temperature.

To illustrate the above by a practical example: If on a tar we found

60° F.	density	= 1,200
100° F.	"	= 1,185
140° F.	"	= 1,170

then

60° F.	1 volume
100° F.	1,01266 "
140° F.	1,02564 "

$V_2 - V_1 = .01298$ C = .000324
$V_1 - V = .01266$ C = .000317

On writing the fifth significant figure 2 we have .00032 as the co-efficient to be used in that particular tar. In practice the problem involved is to reduce a volume of tar taken at a higher temperature to 60° F.

So if
v = observed volume
t = temperature in °F.
c = coefficient of expansion
$V_{60} = V - V\,(t - 60)\,C$

In the accompanying table are shown a number of dry tars thus tested, giving free carbon, specific gravity and co-efficient of expansion. To summarize:

1. The co-efficient of expansion of tar is defined as the amount 1 unit volume of tar will expand or contract for 1° F.

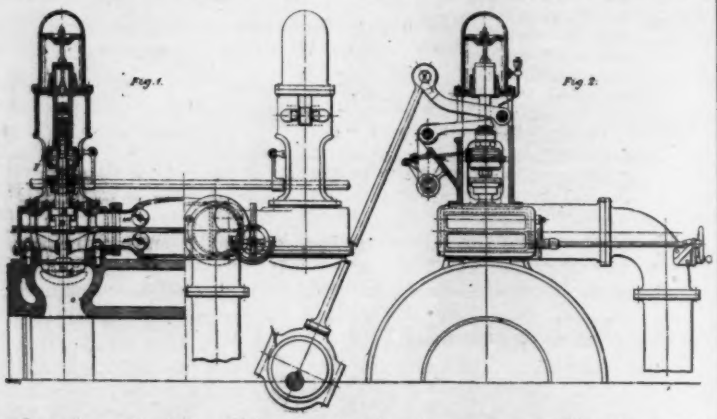
2. The coefficient is practically constant for any particular tar in ordinary ranges of temperature.

3. The coefficients of expansion of a number of tars are given.

Source of Tar.	Free Carbon, Per Cent.	Specific Gravity at 60° F.	Coefficient of Expansion for °F.
Water gas tar.....	1.04	1.073	.0003750
" " "	1.08	1.090	.0003550
Gas works coal tar.....	16.67	1.203	.0003125
" " "	18.53	1.205	.0003125
" " "	27.50	1.249	.0003100
" " "	33.17	1.296	.0002700
Coke oven "	8.97	1.185	.0003375
" " "	5.27	1.193	.0003350
" " "	4.04	1.178	.0003300
" " "	6.72	1.195	.0003250
" " "	6.65	1.197	.0003125
" " "	9.10	1.203	.0003125
" " "	19.06	1.258	.0003075
" " "	15.02	1.231	.0003050

Precision Mixing Valve for Large Gas Engines.[1]

Herewith is illustrated an arrangement of gas and air valves for large gas engines, recently introduced by the British High Power Gas Engine Company, of 3 London Wall Buildings, E.C. The engine is governed by cutting off the gas supply at a later or earlier period of the stroke in accordance with load on the engine. With this plan of governing it is usual to have the gas and air valves arranged side by side and operated by separate gears. In the new arrangement, illustrated in Figs. 1 and 2, the main valve is shown at *A*, with the gas

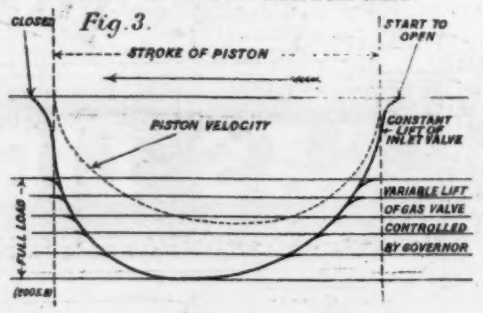


valve above it at *B*. This second valve is an easy sliding fit on the main valve spindle, and is pressed up against its seat by the spring shown at *C*. Just above the valve *B* its hollow spindle is enlarged to form a plunger *D* fitting into a dashpot, which serves to deaden the return of the valve to its seat. A small non-return inlet valve, not shown in the figure, is provided in the cover of the dashpot. The valve *B* is opened by the descent of the main spindle, which carries with it a piston *E*, fitting into a second dashpot, which is also cast in one with *B*. The piston *E*, as already stated, is carried down with the main valve *A* when the latter opens. It is not, however, rigidly coupled to the spindle of the latter, but its position relatively to the same is alterable by the governor, which rotates a sleeve *F* which is screwed internally with right and left-handed threads. If the governor moves this sleeve in one way, the plunger *E* is lowered relatively to the main spindle *A*, and consequently the gas valve *B* is opened earlier. A contrary rotation raises *E* relatively to the spindle *A*, the gas valve opens, therefore, later. The gear which operates the valves is shown in Fig. 2 and consists of an eccentric and a rocking lever. Such an eccentric gives a slow opening to any form of drop valve, but in this case it is the main valve *A* which alone is operated direct by the eccentric. The gas valve, on the contrary, is carried down with the latter after the latter has already made part of its travel and acquired a considerable velocity. In consequence the valve *B* always opens very rapidly.

The arrangement of the one valve above the other, instead of side-by-side, reduces greatly the clearance space in which gas may lodge. It has further to be noted that the gas valve with the arrangement described has in all cases its maximum opening, about the same time as the engine piston has its maximum velocity. This is well shown by Fig. 3, which shows the travel of the gas and main valve for all

1. *Engineering.*

DIAGRAM OF LIFT OF B.H.P. INLET & GAS VALVE.



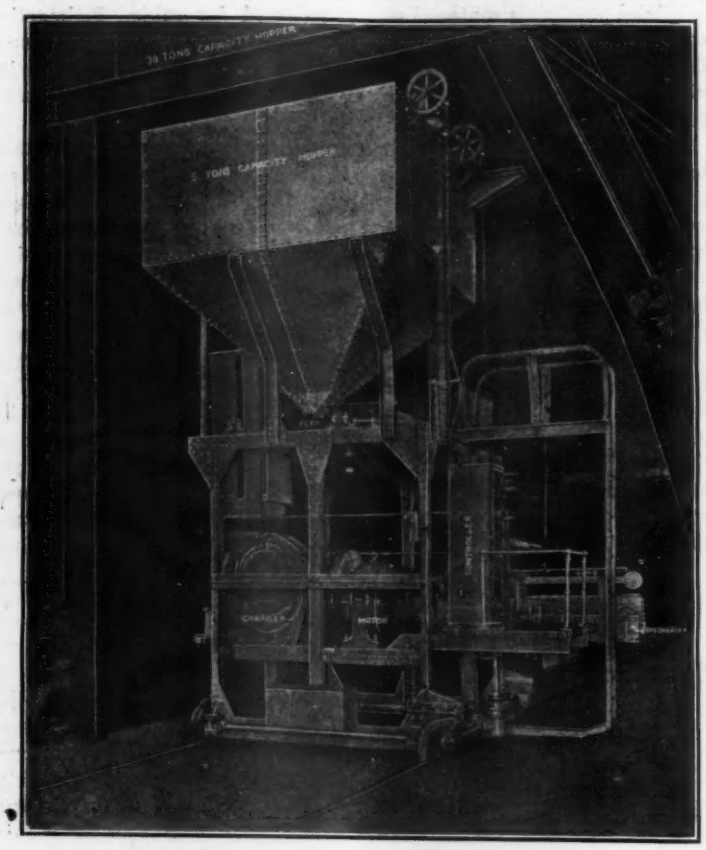
points of the piston stroke. The main inlet valve has a constant lift, and at full load the gas valve begins to open when the piston has acquired about two-thirds of its maximum velocity. The valve closes again just before the piston reaches the end of its stroke. At half-load the gas valve both opens later and closes earlier, and similarly at still lower loads. With the corresponding arrangement of gas valves controlled by the governor in use on some other types of engine, the opening of the gas valve always commences at the same point of the stroke, but closes earlier as the load falls. At light loads, therefore, the piston is moving but slowly the whole time the gas valve is open, and thus the suction in the gas is so small that the charge drawn in is likely to be affected by trivial changes in the gas pressure or the like. Since the gas valve is loose on the main valve stem, each can be kept tight independently of the other. Both valves are accessible for inspection and cleaning, by lifting the casing *H*, and this operation does not necessitate the disconnection of the adjustable parts. The sleeve having the right-and-left-handed thread has its weight compensated by a counter-balance keyed on the governor shaft. The load on the latter is, therefore, always small, and very regular running is secured.

The makers of the engine, Messrs. Fraser & Chalmers, Limited, of Frith, have largely based their designs on the Nurenberg type, but, as explained above, have modified the gas and inlet valve arrangements. Changes have also been introduced into the lines of the engine framing, so that the heavy stresses are taken by straight instead of curved members. We may further add the piston faces are curved instead of flat. This plan has the advantage of giving the maximum of resistance against stresses, produced either by the pressure of the exploding gases, or by the expansion of the piston by heat, together with a complete freedom from casting strains. The piston is, of course, water-cooled internally, a flexible pipe system being used for the supply, thus avoiding the use of glands and stuffing boxes.

A Dempster Stoking Machine at the Blackpool (England) Gas Works.

As an example of "Adapting New Machines to Old Conditions," the *Gas World* notes that in the retort house of the Blackpool gas works there is a bench of 18 beds of 22-inch by 16-inch ⏢-retorts, 20 feet through, each through bed heated by a single furnace. Up till recently the bench was hand-stoked, to facilitate which to the maximum degree coal was brought to the desired position for shovel charging by means of a railway at both sides of the bench, and the coke yard was arranged parallel to the bench, thereby reducing the coke wheeling to a minimum. Moreover, the retorts were set extremely low, the bottom tier being only some 10 inches above the floor, in order to assist the hand-stoking at every point. On the advice of the engineers, Messrs. John and William Chew, a stoking machine, by Messrs. Robert Dempster & Sons, Limited, of Elland, has now taken the place of the shovel. In taking this step towards modernity, the bench has been left as it was in every detail, the stoking machine and all its appurtenances having, in design, to be subordinated to the existing conditions—the framework of the machine being made to permit of the machine stoking the bottom retorts, only some 10 inches above the floor.

The existing hydraulic mains have been fitted with anti-dips of a novel and efficient design, originated by Mr. W. Chew. Two overflow levels to the hydraulic are provided for each bed of retorts, with means for opening and closing the lower overflow, and a pump keeps up a constant flow of tar through the mains. The tar, being heavy, naturally flows along the bottom, thereby carrying away immediately any sediment from the hydraulic. Normally, the dips are unsealed,



but by closing the lower overflow the flowing tar quickly causes the seal to back up to the higher adjustable level, thereby putting the particular bed under seal for the purpose of stoking. Thus, without alteration to ironwork, the benefits of anti-dips are obtained.

To get the advantage of heavy charges in the existing retorts and mouthpieces, without resetting, was one factor influencing the selection of a charging machine, and the selection finally rested with the projector type of machine made by Messrs. Robert Dempster & Sons, Limited, under the "Toogood" patents, for which it is claimed that, in addition to giving light or heavy charges at will, it can deal with quite large coal and create little dust during the process of charging, owing to its slow speed of rotation and positive action. The weight of charge found most suitable to the existing settings and conditions is 9 cwts.

The stay walls in the existing settings not having been designed specially for working with power machinery, and many settings having been in for a number of years, questions of stability arose in considering the type of discharging machine to be adopted.

The machine selected is of the pusher type, made under Dempster and Ordish's patent, the salient features being that the ram has two telescopic sections instead of the usual three, and each section moves simultaneously under the action of wire ropes, so that the ram cannot rise to any extent to thrust against the crown of the retort during pushing, and, moreover, being driven by friction clutch, the retorts cannot be strained by the working of the machine.

Both machines are mounted on one framework, to traverse the retort house as a combined (or complete) stoking machine, with self-contained, 5-ton coal hopper, which is replenished from the main 30-ton storage hopper arranged in the roof. The attendant has absolute control of the coal passing to the charging machine during charging, and can in a moment, by means of a foot pedal, stop or start the supply, even to a nicety of pounds. Also, without moving from his position on the machine platform, he can replenish his supply of coal from the main hopper, thereby saving much time and rendering unnecessary expenditure of much capital in this respect.

Following the path of the coal, the first object of special note is the large receiving hopper—some 10 tons capacity—into which any type of railway coal truck can be quickly and cheaply discharged. From this hopper the coal is extracted at a predetermined rate, say 25 tons per hour, by a Dempster sure-feed, consisting of a reciprocating tray of liberal dimensions, slowly and surely driven backward and forward by an adjustable crank, driven by fast and loose pulleys, such that even the largest of lumps are extracted and fed to the breaker quite automatically, and without the slightest risk of the choking of the elevator or the breaker. The coal breaker is of the 4-roll type, of massive build, which breaks the coal from almost any size to a suitable size for machine stoking. The elevator is of the cased-in type, elevating the coal to the 30-ton storage hopper placed in the roof and central with the length of the retort bench. The whole of the coal plant is driven by a steam engine, placed beneath the charging stage. Automatic drip lubricators are arranged for the elevator chains, guides, etc.

In the electric generating plant interchangeability and safeguards are the keynotes. The dynamo is an exact duplicate in every detail of the motor on the stoking machine, so that the one can be bodily taken to do the other's work, and every detail is interchangeable, thereby cheapening maintenance. As a dynamo, the covers are removed; as a motor, the covers are put on. The output is 30 kilowatts from the dynamo and 20 brake horse power from the motor. The switchboard, in addition to the usual ammeters, voltmeters, switches, fuses and lights, has provided on it an auxiliary switch to which the Blackpool Corporation tramway current is connected, thereby giving two sources of available power, so that should the gas engine or dynamo fail, machine stoking can proceed on tramway current. The dynamo is driven by a 40-horse power gas engine of the latest improved type, having forced lubrication and electric ignition.

[Continued from page 173.]

Four Years' Experience of Vertical Retorts at Cologne.[1]

By Dr. F. Leisse, Chemist at the Cologne Gas Works.

It might be argued that the favorable results obtained with the vertical retorts have been due to the coal having improved in quality in recent years. The results of the analyses made of the coal in the last 3 years and in the year 1902-3 are given in Table IV., and show such close agreement that the results of the make obtained in the different years may be taken as comparable values.

Table IV.—*Average Composition of Coal Carbonized.*

	Year.			
	1902-3.	1908-9.	1909-10.	1910-11.
No. of analyses	128	132	73	118
Moisture, per cent	3.05	2.50	2.37	2.36
Volatile matter, per cent	....	28.49	28.86	28.82
Coke, per cent	....	69.01	68.77	68.82
Ash, per cent	11.07	10.73	10.63	11.58
Calorific power, B.T.U. per lb.	12,571	....	....	12,533

The question whether the introduction of the vertical retort constitutes a great advance in gas manufacture must, therefore, on the strength of these working results extending over a number of years, obviously be answered in the affirmative. It is interesting, however, to inquire how the improved values are obtained, and in what respect the conditions of carbonization in vertical retorts differ from those of the older systems. In the author's opinion, the vertical retort combines in a happy consummation two factors. (1) The complete filling of the whole retort space up to a certain height—*i. e.*, about 27½ inches from the upper edge of the retort mouthpiece—and the closer packing of the coal, whereby the highly heated, uncovered retort walls are reduced as far as possible, and a greater velocity of the stream of gas ensues; and (2) the temperature selected and the possibility of increasing it up to the limit of durability of the firebrick material, and its gradual diminution from the bottom to the top of the retort. The rise in the valuation figure with the increase of temperature is directly dependent on the far greater protection afforded to the produced gas. Gasification takes place more quickly when the heats are higher, while with the vertical retort the gas passes to the ascension pipe chiefly through the cold mass of coal, and only to a small extent past the hot walls of the retort; and as the evolution of gas is greater, its velocity increases and a greater proportion is protected from decomposition. On the other hand, with horizontal and inclined retorts, the gas must pass through the comparatively large free space above the coal, in which it is exposed throughout to the high temperature of the setting. Gasification accelerated by increase in the temperature will in these unfavorable conditions be less capable of realizing the advantages which are associated with the greater production o gas.

1. *Journal of Gas Lighting.*

The assumption that the gasification process takes place in the vertical retort in altered conditions is clearly supported by the quantities and the composition of the by-products obtained. The variations in the ammonia, tar, sulphur, cyanogen and naphthaline produced can only be explained by assuming that the method of working in the vertical retort is fundamentally different. The amount of tar produced in the vertical retort settings was on the average 4.99 per cent. by weight of the coal carbonized the last 3 years, as compared with 4.44 per cent. in the years 1901–2 to 1906–7 when other types of retort were in use. The tar products from the various types of setting are also quite different. The tar from the vertical retorts is a thinly fluid, oily product, whereas that from horizontal and inclined retorts is a thick and viscous material. Table V. shows the difference in the properties of the two tars.

TABLE V.—*Properties of Coal Tar.*

From.	Vertical Retorts.	Horizontal Retorts.
Specific gravity	1.112	1.120
Proportion of pitch, per cent.	25–30	55–60
Free carbon, per cent	1.5–2.5	20–25
Naphthaline	None separated on distillation.	Large quantities separated in solid state.

The yield of ammonia, computed from the amount of ammoniacal products sold, was, on the average of the last 3 years with vertical retorts, 0.322 per cent. of real ammonia on the weight of coal carbonized, or equivalent to 28 pounds of sulphate per ton of coal; whereas in the years 1901 to 1907 the proportion of real ammonia was 0.232 per cent. of the weight of coal carbonized, which is equivalent to 20¼ pounds of sulphate per ton.

The coke produced under the higher pressure prevailing in the vertical retort is denser than that produced in inclined and horizontal retorts, and more nearly resembles oven coke. It is in large pieces, and the weight of a given volume is greater. The ratio of the weight of a given volume of inclined retort coke to vertical retort coke is 1:1.16.

Attempts to ascertain the amount of coke consumed in water gas production led to no conclusive result; but it is clear that the scurf largely contributes to the decomposition of the steam, because in the lower half of the retort it is of a porous, honeycombed structure, as opposed to the close structure of that in the upper part. It may be pointed out that the water gas produced in vertical retorts differs considerably in calorific power and composition from that made in separate generators. It is carburetted to a certain extent with methane and heavy hydrocarbons, either in the retort or on its way to the hydraulic main. This should be taken into consideration in any comparison of the economy of the two methods of producing water gas. Table VI. shows the difference in the composition of the two gases.

TABLE VI.—*Quality and Composition of Water Gas.*

From.	Vertical Retorts.	A Generator.
Calorific power, B.T.U. per cubic foot at 60° F. and 30 inches	330	288
Carbonic acid ..... Volumes per cent.	1.6	2.2
Heavy hydrocarbons ..... " " "	0.8	....
Oxygen ..... " " "	....	0.4
Carbonic oxide ..... " " "	40.0	42.4
Methane ..... " " "	1.2	0.3
Hydrogen ..... " " "	53.3	50.6
Nitrogen ..... " " "	3.1	4.1
	100.0	100.0

The introduction of the vertical retort has been attended with certain indirect advantages of considerable importance. The proportion of naphthaline in the gas is so small that naphthaline washers are no longer necessary. The amount in the purified gas is so little that it cannot be estimated exactly. When vertical retorts were first brought into use, however, the naphthaline already clinging to the walls of the distributing mains was taken up by the gas poorer in naphthaline and carried forward, and it was either recovered in the syphons or it blocked the service pipe. The proportions of cyanogen and sulphur in the crude and purified gas are shown in Table VII.

TABLE VII.—*Cyanogen and Sulphur in the Gas.*

	Crude. Gas, Retort, Vertical.	Crude. Gas, Retort, Inclined.	Purified. Gas, Retort, Vertical.	Purified. Gas, Retort, Inclined.
Cyanogen, grains per 100 cubic feet.	46.3	101.4	8.74	19.67
Sulphur, " " " " " .	323.4	458.9	13.98	20.98

It has not been possible to establish the relief afforded to the purifiers on the large scale by the reduction in the proportions of cyanogen and sulphur in the gas, because a new purifying system was brought into action at the same time as the vertical retorts, and later, artificial purifying material was substituted for oxide. Exhaustive experiments in the experimental plant, however, show that the artificial oxide purifies about double as much vertical retort gas as inclined retort gas. These figures are in substantial agreement with the analytical results given in Table VII.

Naturally, it has not hitherto been possible to give an exact answer to the question of the durability and the cost of repairs of vertical retort installations. Previously, the only answer that could be given was that in this respect they appeared to be quite fulfilling the best anticipations. It has now been established, however, that during the period of 4 years working there has not been a single case where it has been necessary to repair the retorts or the settings themselves. Current maintenance charges included only the natural replacement of mechanical parts, the renewal of the lower doors which burned through after a time, and partial renewal of the upper lids. The latter, as first made, were too weak, and have been strengthened by ribs and an alteration of the eccentric framing. The consumption of the lower doors averages 10 per cent., and of the upper lids 12 per cent. per annum. The different benches of settings have remained in work for the number of days stated below before it has become necessary to renew, partially or entirely, the retort chamber.

Bench No. I.	1,501	setting days.
" No. II	963	" "
" No. III	1,115	" "
" No. IV	1,345	" "

The average working life has, therefore, been 1,231 days.

The great differences shown for the various benches are due to the desire to avoid repairing the whole of the settings at the same time, and to distribute the work of repair. Consequently, the lower halves of the retorts in Benches II. and 111. were replaced before absolutely necessary; while Bench No. IV. was reconstructed in May and June last, and the renewal of Bench No. I. will be put in hand this autumn. The average make of gas per setting has been 166,504,300 cubic feet, compared with 123,606,000 cubic feet for horizontal retort settings. The cost of the repairs for the 24 vertical retort settings has been $17,500. This includes the cost for Bench No. I., which is to be carried out this autumn, and for which the expenditure on Bench No. IV. gives the necessary figures. The cost of repairs or renewals has, therefore, been found to amount, for vertical retort settings, to 4.6 cts., and for horizontal retort settings to .08 ct., per 1,000 cubic feet of gas made. It has not yet been possible to ascertain exact figures for the inclined retort settings, as they have been so little used that renewal will only become necessary in the course of the present year.

The lower cost of repairs of the vertical retort settings is chiefly to be ascribed to the much greater make of gas and the lighter construction of the settings. On taking down the settings, however, they were found to be throughout in such good condition that, with the exception of the retorts and the stiffening slabs in the lower parts, almost all the material could be used again in the reconstruction. There were only trifling settlings of the side walls of the settings, and the burner-nozzles had not been affected by the fire. The producers were relined in the furnace zone, and the slabs above the clinkering doors were also renewed in order to insure smooth working.

In conclusion, the author points out that the comparative values given in his paper admit of deductions being drawn as to the working and economical advantages of the vertical retort system over the older systems of carbonization. The greater make of gas, the increase in the valuation figure with the rise of temperature, and the quantity and composition of the by-products obtained, show that carbonization takes place under greatly altered conditions, which open out a hopeful prospect for the further development of the vertical retort setting. The settings of 18 vertical retorts which are now being introduced, with still better working results, already show further progress.

The Gas Engine Pumping Plant at Haddonfield, N. J.

The W. R. McLain Company, of Philadelphia, Pa., in the course of business, some time ago, were commissioned by the Otto Gas Engine Works to gather information regarding the operation of a gas engine plant that had been installed by the authorities of Haddonfield, N. J., for the better water supplying of that place. The result of the compiling, which latter is traceable to a report made by Mr. George Pfeiffer, Jr., of Camden, N. J., to the Haddonfield authorities is:

The water supply of the town of Haddonfield, N. J., previous to 1905, had been a source of frequent complaint on account of poor quality and lack of pressure and quantity for adequate fire service. In 1909, after prolonged investigations, negotiations and legal pro-

ceedings, an order was given for a new plant, which was completed in 1910.

The new water works derives its supply from four artesian wells, driven some 220 feet to a water-bearing strata of pure white sand and gravel overlaid by an impervious stratum of clay, which excludes surface water. From each well a 6-inch pipe leads to a 12-inch main, running to a watertight concrete cistern, 30 feet in diameter and 42 feet deep. The 12-inch main dips 30 feet into the cistern and as soon as the water is pumped below the level of the main a supply is siphoned from the wells.

The new pumping plant is located at the foot of a hill and at the edge of the basin in which the artesian wells were driven. To the right of the building is the coal bin with a bridge to the station while to the left is a covered pumping cistern. The buildings and equipments thereof have been kept as nearly fireproof as possible by the elimination of wood in construction.

Fig. 1 is a general view of the interior of the station. There are two complete duplicate pumping units each consisting of a gas producer, gas engine, and triplex-geared pump. Either operating unit can be run independently of the other, or both may be used at the same time, and each has more than twice the present required capacity under ordinary conditions. The units are cross-connected also, so that one engine may run on the producer of the other unit.

Fig. 3 shows that the producers are on a platform at ground level, while the pumping machinery is in a pit 8 feet below. An iron walk encircles the machinery pit and connects the front entrance with the producer platform. The floor of the machinery pit is 5 feet below the level of ground water, so that it is subjected to an upward pressure of some 300 pounds per square feet. The floor, which is of impervious concrete, is several feet in thickness, was located at this low level to prevent excessive suction head when the water level in the cistern was drawn down by heavy pumping.

The producer platform measures 16 by 24 feet, and the producers are of a suction type burning anthracite fuel. Each consists of the producer proper with a superimposed cast iron evaporator. Fig. 4 shows the elevated charging platform for the producers, reached from the producer floor by an iron stairway. The platform which is of steel is large enough to give access around the tops of both producers for stoking and cooling. The charging platform extends to a door in the side of the building and runs beyond as the bridge leading to the coal bin 20 feet away and on the same level, as shown in Fig. 5. At the top of the embankment, adjacent to the west side of the plant and 43 feet above the level of the producer room, is a railroad siding with a concrete and steel coal trestle. A chute extends from beneath the trestle to the bin which is built into the embankment. This bin has a capacity of 50 tons and is built with a concrete floor and back wall, but with timber front and sides. The coal is wheeled in a barrow from this bin directly to the charging openings in the producers.

Each engine is an 85-horse power, horizontal, single cylinder, Otto type, directly connected to the pump, through a friction clutch. Fig. 3 shows the engine side of the unit and Fig. 4 the pump side. As shown in Fig. 4, the friction clutch is operated by a hand wheel. Each pump has a capacity of 1,250,000 gallons in 24 hours, pumping against a total head of 250 feet. This requires 55-horse power,

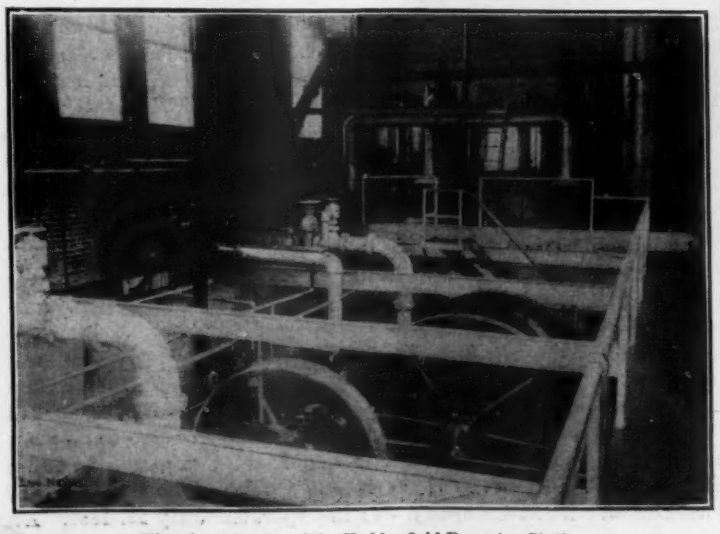


Fig. 1.—Interior of the Haddonfield Pumping Station.

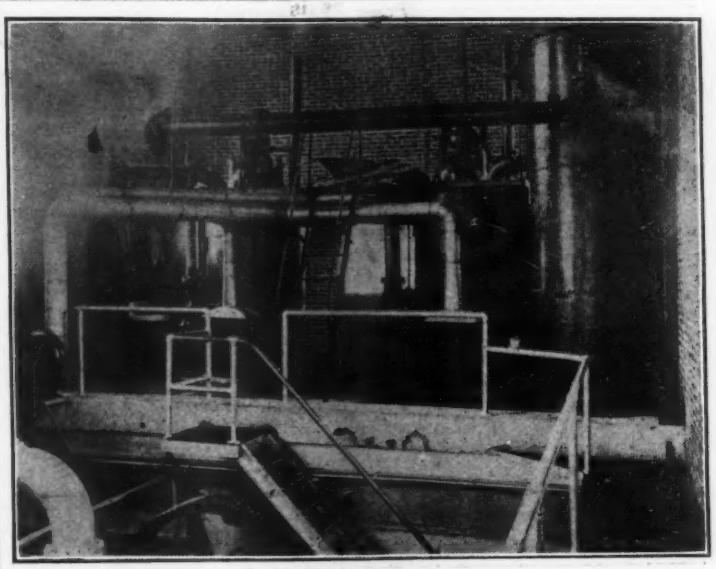


Fig. 2—Interior of the Haddonfield Pumping Station.

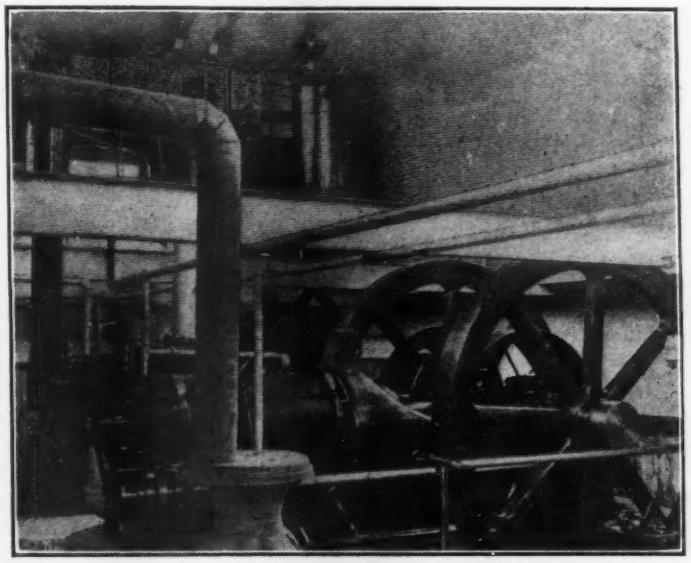


Fig. 3.—Engine Side.

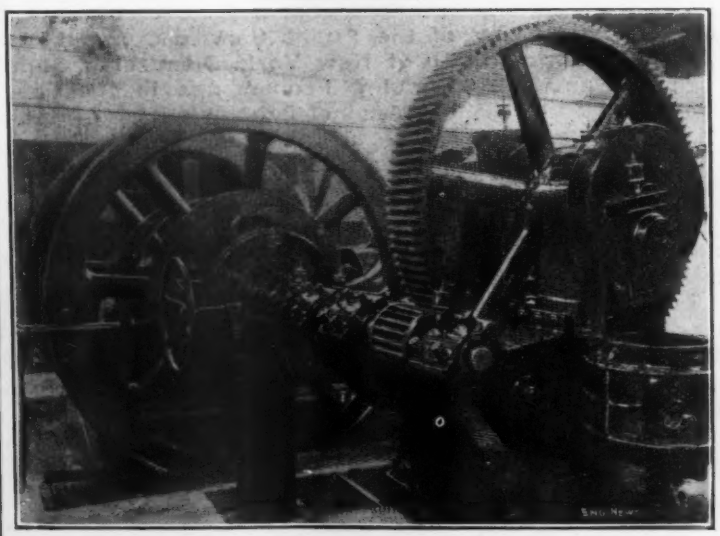


Fig. 4.—Pump Side.

which is only 65 per cent. of the rated capacity of the engines, leaving at least 35 per cent. overload capacity so that the supply may be furnished at a temporarily increased pressure of 150 pounds in case of fire.

There is an auxiliary equipment of a 2-horse power, vertical, gasoline engine for driving a compressor, centrifugal blower and drainage pump for the machinery pit. The compressor, with a storage tank, is used for starting the larger engines. The blower is used for

Fig. 5.—Coal Trestle, Chute and Bin.

starting the producer fires in the morning or after a long shut-down.

The piping is all exposed and accessible. The suction lines are laid beneath the floor and concrete channels and are covered by steel floor plates.

To remove from the room any dust arising during the necessary stoking of the producers, a line of galvanized pipe, Fig. 3, runs from a suction fan to the fire doors of each producer. Whenever clinkers are drawn out, at intervals of several hours, the fan is started and discharges the dust outside the building.

From the pumping station the water is forced through a 12-inch discharge line 2,000 feet to a standpipe, located on one of the highest elevations in the town. There is a total length of 66,000 feet of cast iron pipe in the distribution system.

The cost of pumping is claimed to be $11.20 per 1,000,000 gallons, compared with an estimated figure of $18.10 for a steam-driven plant. In these figures comparative data of steam pumping plants of similar size elsewhere have been used, except where actual prices bid for a steam plant here were used in determining charges for interest, depreciation, etc. These figures for pumping do not represent cost of service outside the building and contain no charge for interest, depreciation and sinking fund on the system beyond the station.

Opinion and Order of the Public Service Commission, First District, State of New York, Dismissing Complaint and Discontinuing Proceedings in the Case of Baltz and Others Against Brooklyn Borough Gas Company and Kings County Lighting Company.

Opinion of the Commission.—This proceeding is the second in which a company has voluntarily offered to submit the matter of rates to the Commission and to accept the determination of the Commission whatever it may be without controversy or litigation.

The proceeding started originally from a complaint by the customers of the Brooklyn Borough Gas Company and the Kings County Lighting Company against the rates charged for gas in the 31st Ward of Brooklyn. The complaint was made under Section 71 of the Public Service Commissions Law, which provides that "upon the complaint in writing of not less than 100 customers or purchasers of such gas ..... as to.....price of gas.....sold and delivered in such municipality, the proper Commission shall investigate as to the cause for such complaint." Two petitions were filed, dated October 14, 1910, complaining of the rates charged by the Brooklyn Borough Gas Company and also by the Kings County Lighting Company. Both petitions alleged that the price charged was excessive and unreasonable. Each petition purported to contain the names of more than 100 consumers of gas in the 31st Ward. As they were apparently in proper form, an order was adopted by the Commission for a hearing and formal proceedings were instituted.

At the time of the complaint, a case was pending before the Commission against the Kings County Lighting Company affecting the rates charged in the 30th Ward, in which nearly all of the territory supplied by that Company is located. A very small portion of the 31st Ward is also served by the Kings County Company. As the rate charged by that Company was the same in both Wards, and would be affected by the decision in the pending case, the proceedings in this case were restricted to the Brooklyn Borough Gas Company, which supplies the 31st Ward and a very small section of the 32d Ward.

Before the date set for the hearing, the Company proposed to leave the question of a proper rate to the Commission, stating in a letter dated November 19, 1910:

"This Company is perfectly willing to submit this matter entirely to the Commission and abide by its decision. When the Commission shall have decided what the maximum rate for gas shall be, we will put it into effect promptly and use every effort to make it successful to the Company as well as to the consumers. If, however, experience shall show that such rate will not allow a fair return to the Company in our opinion, we wish to reserve the privilege to initiate such proceedings as may be necessary to secure a modification of the rate after a trial of a year or more. We will hold ourselves in readiness to have an examination made whenever it is convenient for the Commission to order it."

Following the precedent in the case affecting the Queens Borough Gas and Electric Company, the Commission decided to adjourn the formal proceedings, and informal hearings were instituted.

History of the Present Rates.—The Brooklyn Borough Company is the only Company supplying gas to the 31st Ward, except in a small area immediately adjoining the territory of the Kings County Lighting Company. At the time of complaint the Brooklyn Borough Company was charging $1.05 to private consumers and 75 cents for gas supplied to street lamps and municipal buildings.

The franchises from the town of Gravesend contain no limitations on the price to be charged for gas. Moreover, the rates charged by the Companies operating under these franchises were free from legislative regulation until the annexation of the town of Gravesend to the city of Brooklyn, July 1, 1894. Thereupon, the rate to be charged by the predecessor of this Company became $1.25 under the provisions of an act of 1890 (Ch. 566, Sec. 70), prohibiting a corporation from charging more than $1.25 in any city having a population of 800,000 or over. This was the rate in effect upon the organization of the present Company in 1898, and was not disturbed before 1905 and 1906. In 1905 an act of the Legislature (ch. 736) fixed 75 cents as the maximum rate for gas supplied to the city. In 1906, the Legislature (ch. 125, Sec. 3) prescribed the following rates for subsequent years:

Period.	Rate.
1907	$1.20
1908	1.15
1909	1.10
1910	1.05
Thereafter	1.00

In its letter, submitting the determination of a proper rate to the decision of the Commission, the Company wrote:

"We are confident that a careful examination of our location, property and business will show that the rates fixed by Legislative Act are and have been too low and that the statutory limit for the year 1911 of $1 per 1,000 cubic feet will not afford a reasonable profit. We will very much appreciate it if your Commission will authorize such an examination, not only of the physical condition of the Company, but also of the financial condition, as we feel assured that the Commission will sustain our contention that it is impossible for us to make a proper return on the amount of capital invested by this Company at $1 per 1,000 cubic feet, which is the rate that we are to charge as indicated in the bill passed by the New York Assembly 4 years ago. If we are correct in our belief, it follows that we will be unable to make any further reduction for the year 1911."

While this Company was charging $1.05, the rate in the rest of Brooklyn was 80 cents, except in the adjoining 30th Ward where the rate was $1. The latter rate was at the time also subject of complaint.

Corporate History.—The Brooklyn Borough Gas Company was incorporated under the Transportation Corporations Law of New York, filing its certificate February 23, 1898. It is neither a merged nor consolidated Company. It succeeded to the franchises and property of the Coney Island Fuel Gas and Light Company, the latter assigning its franchises to it on March 5, 1898. The Coney Island Fuel Gas and Light Company was incorporated July 22, 1881. According to its certificate its capital stock was $300,000, all to be issued

in payment for property. It acquired its property and franchises on September 1, 1882, from Henry B. Plant and wife, to whom they had been sold in the foreclosure proceedings of the Kings County Gas Light Company and deeded under date of April 24, 1882. The consideration named in the deed is $50,000. The Kings County Gas Light Company later gave to the Coney Island Company a confirmatory deed on June 6, 1891. The Kings County Gas Light Company (incorporated December 17, 1877, with a capital stock of $200,000) in turn received its franchises from John Lockwood and Company, a copartnership, which had acquired them through assignment from the original grantee, John Lockwood. The original grants were obtained from the town of Gravesend, under date of July 26 and December 6, 1877.

The present Company was incorporated for a term of 50 years with a capital stock of $500,000. Its objects were "manufacturing and supplying gas for lighting the streets and public and private buildings of the city of New York, in the State of New York, and manufacturing and using electricity for producing light and heat and power and in lighting streets, avenues, public parks and places and public and private buildings of cities, villages and towns within this State." It immediately acquired all the assets and property of the Coney Island Fuel Gas and Light Company "free from all debts and obligations, including its bonded debts of $55,000." In consideration for this property, it issued all of its capital stock ($500,000) and $240,000 in 5 per cent. bonds. The books of the Coney Island Fuel Gas and Light Company were not available, and the only information about the value of its property is a trial balance as of June 30, 1897, contained in a letter book of that Company, later used by the present concern. This trial balance antedates the organization of this Company by 8 months. From this trial balance an accurate balance sheet cannot be constructed, it being impossible to ascertain the character of some of the accounts. As shown by the trial balance the fixed capital, exclusive of $10,000 "Treasury Assets," consisted of

Real estate	$10,500.00
Construction account	267,519.03
Sheepshead Bay extension	9,598.88
	$287,617.91

The total debits were $329,348.36, and on the liability side appear:

Capital stock	$160,000.00
Bond mortgage	55,000.00
Notes payable	19,213.92
Other items, apparently loans	10,950.00
	$245,163.92

On the asset side there remain, exclusive of the "Treasury Assets," some $30,000, of which at least $10,000 would apparently be items belonging to the income account. On the liability side the other items amount to about $85,000, of which the chief item is "Profit and Loss," $59,856.28. The only point that is certain from the evidence is the amount of funded debt outstanding. The present Company on organization issued $240,000 in bonds where originally $55,000 had been outstanding. It also issued $500,000 in stock or more than three times as much as is shown in the above trial balance.

Additions to Property Since Organization.—The Brooklyn Borough Gas Company opened its books with a balance sheet summarized below. From the above trial balance, it appears that a large, if not the largest, part of the entry "Real Estate, Plant and Machinery," was merely an amount to balance the securities issued.

The additions to the property during the life of the present Company are shown by a comparison of the balance sheet of April 1, 1898, with that of December 31, 1910.

	Balance Sheets. Apr. 1, 1898.	Dec. 31, 1910.	Increase.
Assets:			
Real estate, plant and machinery (fixed capital)	$736,978.61	$1,561,976.09	$824,997.48
Current assets	3,021.39	56,034.59	53,013.20
Unamortized bond discount and exp.		40,559.95	40,569.96
	$740,000.00	$1,658,570.64	$918,570.64
Liabilities:			
Capital stock	$500,000.00	$500,000.00	$
Funded debt	240,000.00	670,050.00	430,050.00
Unfunded debt		333,817.83	333,817.83
Depreciation reserve		30,684.62	30,684.62
Surplus		124,018.19	124,018.19
	$740,000.00	$1,658,570.64	$918,570.64

According to the balance sheet there has been an increase in fixed capital of $824,997.48. This is balanced by the following items:

Increase in funded and unfunded debt, less increase in current assets, and less bond discount	$670,294.67
Depreciation reserve	30,684.62
Surplus	124.018.19
	$824,997.48

From the above analysis it appears that the additions were financed principally by the issue of new securities, but that $124,018.19 of earnings have been put back into plant, in addition to the amounts set aside for depreciation in 1909 and 1910. Attention is called to the fact that the figures for additions as they stand on the books are the original charges, undiminished by any credits for depreciation. On the other hand, betterments were charged at the full cost to construction, and nothing was written off where inadequate mains were paralleled by trunk lines of larger capacity. No reserve was carried for depreciation before January 1, 1909. For 1909 and 1910 the reserve set aside is $30,684.62.

In connection with the history of the present property, the following facts are pertinent. The manufacturing plant acquired by this Company was at West Fifth street. With the growth of business it proved inadequate and uneconomical, being without any water frontage to facilitate the handling of coal and oil, and without adequate room for growth. It was, therefore, necessary to buy additional land, and a plant has been constructed at West 12th street, where all the manufacturing is now done, and all of the effective storage capacity is located. The old plant is at present not in use, and will soon be removed. Of the total amount charged to construction $300,701.95 has been charged to the construction of the new plant. The other expenditures for additions include approximately $85,000 spent on the old works.

From the evidence it is impossible to ascertain what was the original investment in the property of this Company. If the data in the trial balance be accepted, $300,000 would be more than the book value of the assets taken over by the present Company. That amount, plus the addition made by this Company diminished by the accrued depreciation would yield in round numbers $900,000.

Securities.—As noted before, the securities of this Company at time of organization amounted to $240,000 in bonds and $500,000 in stocks. Since the organization, the following additional liabilities have been contracted:

Bonds, 5 per cent	$409,000
Demand notes, 6 per cent	259,250
Purchase money mortgages	21,050
	$689,300

The bonds were issued under two mortgages. At the organization of the Company a mortgage was executed, dated March 5, 1898, authorizing the issue of $500,000 bonds. Of these $240,000 were given in part payment for the assets taken over. The balance was sold for $235,852.50, or at a discount of $24,147.50. On June 1, 1905, a general mortgage was executed, authorizing the issue of $1,000,000 bonds, of which $500,000 were to be used for taking up the earlier issue. Under this mortgage, the Commission of Gas and Electricity has approved the issue of $895,000, $500,000 for retiring the earlier bonds and $395,000 for additions. Bonds to the amount of $149,000 were sold at $125,960, or at a discount of $23,040. As in the case of the earlier issue, the rate is 5 per cent. The total discount has been $47,187.50. The discount was charged to suspense, and partly amortized. The amount in suspense for unamortized bond discount and expense on December 31, 1910, was $40,559.96.

Financial Results of Operation.—In order to determine whether the Company is making sufficient profits to justify a reduction in rates, it is necessary, first, to examine the returns for 1910, which was the most profitable year during the last 7 years at least. If it should be found that the Company did not earn more than a reasonable profit in that year, it will be unnecessary to examine the results of preceding years. The following table contains the most important data:

TABLE I.—*Operating Results*, 1910.

Cubic feet of gas made	241,930,000
Cubic feet of gas sold	213,817,000
Per cent. of gas unaccounted for	11.2

(*Continued on page* 186.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, SEPTEMBER 18, 1911.

[Official Notice.]

Sixth Meeting, American Gas Institnte.

The Sixth Annual Meeting of the Institute will be held at St. Louis, Mo., on Wednesday, Thursday and Friday, October 18th–20th 1911.

The Headquarters will be in the Hotel Jefferson, and the meetings will be held in Memorial Hall, 19th and Locust streets.

The Committee on Arrangements has made preliminary plans for a banquet on Thursday evening, and an excursion on the river for Friday afternoon. The ladies will be entertained with an automobile ride and luncheon, Thursday noon, and a theater party on Thursday evening.

The Committee on Arrangements is composed as follows: C. L. Holman, Chairman; D. R. Russell, August Court, C. H. Quackenbush, A. C. Einstein, T. D. Miller, John Dell, C. H. Dickey, R. B. Hatton, R. A. Walsh, E. A. Downey, E. H. Boehnken.

The Chairman of the Technical Committee announces the following papers to be read at the meeting:

"Intensive Scrubbing and Condensing of Gas," by L. E. Worthing, Detroit, Mich.

"The Manufacture of Illuminating Gas in By-Product Ovens in the United States," by W. S. Blauvelt, Semet-Solvay Company, Detroit, Mich.

"Report on Verticals at Providence, R. I.," by Carroll Miller, Providence, R. I.

"Report on Verticals at Manchester, N. H.," by W. G. Africa, Manchester, N. H.

"Turbo-Blower," by an Engineer with the General Electric Company.

"Production and Market for Sulphate of Ammonia," by an Engineer with the New England Gas and Coke Company, Boston, Mass.

"Tar Distillation and Market for Its By-Products," by Alan D. Whittaker, Atlanta, Ga.

"Actual Leakage in Unaccounted for Gas," by J. D. von Maur, St. Louis, Mo.

"District Holders and Their Place in a Distribution System," by R. M. Griswold, Denver, Col.

"Flow of Gas in Mains," by J. W. Battin, Detroit, Mich.

"U. S. Government Report on Electrolysis," by S. W. Stratton, Bureau of Standards, Washington, D. C.

"Pacific Coast Conditions," by John A. Britton, San Francisco, Cal.

"Photometric Work," by C. O. Bond, Philadelphia, Pa.

"Cost and Results Obtained from Automobile Delivery," by L. R. Dutton, Wyncote, Pa.

"Valuation of Public Utilities," by H. C. Abell, New York city.

There will also be some interesting Committee Reports, and the Report of the Editors of the Wrinkle Department and Bureau of Information. It is possible that arrangements may be made for a Lecture on "Some Recent Developments in Gaseous Combustion."

At a regular meeting of the Board of Directors, held August 19th, 1911, the following gentlemen were elected as the Nominating Committee: C. H. Nettleton Chairman; Jas. H. Jourdan, W. H. Gartley, James Ferrier and J. H. Eustace.

In case of inability to serve, the following gentlemen were named as alternatives: J. A. Britton, T. C. Jones, C. M. Cohn, J. D. von Maur and H. M. Moore.

A. B. Beadle, Secretary.

[Official Notice.]

Twentieth Annual Meeting, Michigan Gas Association.

The Twentieth Annual Meeting of the Michigan Gas Association will be held in Detroit, Mich., September 20, 21 and 22. Headquarters will be the Hotel Pontchartrain. A most interesting programme of papers has been prepared as follows:

"The Function of Tar in the Condensation of Coal Gas," by Prof. Alfred H. White, and the Holder of the Scholarship.

"Advertising: A Brief," prepared by C. A. Brownell.

"Experiments in the Taylor System of Shop Practice, by "Ben." M. Ferguson.

"A Purchasing System for a Gas Company," by Albert G. Schroeder.

(a) "Use of Reinforced Concrete in a Gas Works," by H. W. Douglas.

(b) "A Concrete and Wood Condenser House," by E. F. Lloyd.

"Filament Ignition of Gas," by Prof. Howard Lyon.

"Development of the Hotel and Restaurant Gas Appliance Business," by W. F. Clausen.

"Directions for the Recovery, Concentration and Testing of Ammonia," by James A. Brown.

In a city the size of Detroit there is so much of interest to one and not to another, and so little that can be covered in the time allotted, it has been decided to make the entertainment features as elastic as possible to the end that all tastes may be suited.

Wednesday and Thursday, the 20th and 21st, will each have two business sessions, and it is the intention to hold these on schedule time so as not to make it necessary to interfere with the other arrangements.

At the close of the afternoon sessions, on Wednesday and Thursday, automobile accomodations will be provided for all holders of entertainment tickets, either gentlemen or ladies. Automobiles will be at their disposal, for 2 hours, from 4 to 6 o'clock, to make such a tour of the city and visit such points of interest on the American side of the river as they may desire, dropping them at any hotel or inn desired at 6 o'clock. Parties for the automobile trips should be made up well in advance in order to insure the most congenial company to everyone.

Friday, the 22d, will be devoted entirely to factory inspections, including probably the Packard or the Ford automobile plants, various gas works, stove and appliance factories, special industrial installations, etc., and members desiring to visit any particular point on this day will insure proper accommodations by notifying the secretary well in advance.

For the convenience of those attending, the entertainment programme will contain a complete list of all points of interest, as well as the best places to lunch, dine, etc., together with minute directions for getting there. There are so many places on both sides of the river reachable by automobile, trolley and boats, which are both interesting and beautiful, that a large attendance should be brought out, not only among the members, but of those from a distance as well.

For the convenience of those who may desire to stay over for a side trip Saturday and Sunday, we will give a list of boat schedules to the Flats, Put-in-Bay, Cleveland, Buffalo, Niagara Falls, etc.

The hotels with which the members will be most interested are these: Pontchartrain, Cadillac, Hotel Tuller, Griswold House, The Wayne and the St. Claire. As the Michigan State Fair will be held in Detroit during the week of the meeting of the Michigan Gas Association, it will, of course, be the part of wisdom to make hotel reservations at the earliest possible moment.

The entertainment programme became an assured success the moment the committee appointed Messrs. R. Shacklette, L. B. Young and W. S. Blauvelt.

Yours very truly,

Glenn R. Chamberlain, Secretary-Treasurer.

[Official Notice.]

Seventh Annual Convention, National Commercial Gas Association.

Considerable interest is being noted throughout the entire gas industry over the coming Convention and Exhibition of gas appliances of the National Commercial Gas Association, to be held in Denver, Col., October 23 to 28. From the standpoint of the manufacturers the exhibition will be a complete success, as their hearty co-operation and early contracting of spaces have now assured every space in the Hall being taken.

The attendance is expected to eclipse any former meeting of gas men ever held. The Association is now recognized throughout the country, and has demonstrated upon former occasions its ability to offer every facility for bringing the gas men from all parts of the country together, not only to meet the manufacturers, but to meet on a common ground and discuss the vital questions which are of paramount importance to the industry. Assurances from all sections of the country leave no doubt as to the attendance, which will probably establish a new record for conventions of gas men.

The membership of the Association is steadily growing in a most satisfactory manner, and, with the advantages offered to members through its monthly "Bulletin," its educational course for salesmen,

formation of company sections and standardizing handbooks of appliances, should be enjoyed by all. No gas man should hesitate an instant, but join at once.

The Membership Committee has offered two prize trips to the Denver convention to the members securing the highest percentage of increased membership, based on the relation which the number of applications bears to the population of the city from which received, thus offering an equal opportunity to meu in a small community with those in large situations. The prizes will be worth approximately $125 each—surely well-worth trying for. Details of the plan have appeared for several months in the monthly "Bulletin" of the Association.

Paper Programme.—The list of papers has been carefully selected this year, with a view to offering as wide a range of subjects as possible, and the discussions should prove most interesting and instructive:

"An Equitable Sliding Scale for the Sale of Gas." Editor not yet selected.

"Up-to-Date Advertising Methods." T. R. Elcock, Jr., Advertising Manager, the U. G. I. Co., Philadelphia, Pa.

"Illuminating Engineering and Its Application to the Gas Industry." E. L. Elliott, Editor, "Illuminating Engineer," New York City.

"Exhibit and Description of Model Glass Gas Works." A. F. Traver, Supt. Gas Dept., Denver (Col.) Gas and Electric Co.

"The Modern Gas Fixture." Chas. Ummach, Sec., R. Williamson Co., Chicago, Ills.

"The Designing and Construction of Gas Appliances." R. E. Clark, George M. Clark Stove Co., Chicago, Ills.

"Increased Efficiency in Scientific Office Accounting." P. R. Jones, Auditor, Doherty Operating Co., New York City.

"Practical Demonstration Work." Mrs. Anna A. Carroll, Demonstrator, the U. G. I. Co., Philadelphia, Pa.

The entertainment features will, without doubt, prove too alluring to resist. The Committee has indeed reason to feel proud of the novel chain of features which will be presented to those attending the meeting. Besides the usual theater parties, auto rides through the city and suburbs, "smoker" for men, luncheons and receptions for the ladies, of particular interest will be the 3 day trip (following the closing of the business session) through the mountains, including a specially arranged cowboy, chuck-wagon dinner in the "Garden of the Gods," followed by a real rough-riding exhibition.

Colorado offers every facility for a real holiday trip, embracing features which could be arranged in no other locality, and the atmosphere of the "Far West" is indeed a strong drawing card and should be given serious consideration. You cannot afford to lose such an opportunity, which may never occur again, not only from a business standpoint and the value of such a meeting, but also for the benefit such a trip will be to you.

Special trains have been arranged for by the Association to leave Chicago, October 22d, at 5 P.M., arriving in Denver Monday evening, 7:30; leaving St. Louis, October 21st, at 2:15 P.M., arriving at Denver October 22d, at 5:35 P.M. It has not been possible to secure reduced rates, all the passenger associations having declined to make concessions, therefore, the full fare will be charged. The expense of the trip will, of course, be gauged by the distance members must travel and the hotels selected. Full details of hotel accommodations, etc., will appear in the September issue of the monthly "Bulletin" of the Association, and any gas man not a member of the Association may procure a copy of same by addressing the Secretary, Mr. Louis Stotz, at 29 West 39th street, New York. Our Colorado friends extend to you a cordial invitation to be present during the week of the Convention, and assure you of a most interesting trip.

[OFFICIAL NOTICE.]

Annual Meeting, Empire State Gas and Electric Association.

OFFICE OF THE SECRETARY,
EMPIRE STATE GAS AND ELECTRIC ASSOCIATION,
N. Y. City, Sept. 9, 1911.

The annual meeting of this Association will be held in the United Engineering Societies' Building, Friday, October 6th, starting at 10 A.M. The programme will consist of the reports of numerous committees and the discussion based upon these reports. There will also be some discussion on several of the recent opinions of the Public Service Commission which are of particular importance, and also of the question as to the extent to which public service corporations should enter into civic relations. The election of officers for the ensuing year will take place at this meeting.

Those attending the meeting will lunch together at the Engineers Club during the noon recess.

Very truly yours,
CHARLES H. B. CHAPIN, Secretary.

[OFFICIAL NOTICE.]

Bureau of Information, American Gas Institute.

OFFICE OF THE CHAIRMAN,
SCHENECTADY, N. Y., Aug. 9th, 1911.

To the Members, American Gas Institute: The Committee in charge of the Bureau of Information, having received comparatively few inquiries so far, earnestly urge that all the members of the Institute, having questions or problems which they would desire answered or olved, will please forward them to the Committee at as early a date as possible, as we are anxious to place the answers in the hands of those making the inquiry, getting all these inquiries compiled in time for the report of this Committee at the next annual meeting.

Please do not assume that there are others who are going to bring forward the questions, the information regarding which you would like to have, but take the initiative and write the Committee at once regarding any questions which you would like answered, and we will endeavor to gather as much accurate informa tion as possible on the subject in which you are interested.

M. WEBB OFFUTT,
Gas and Electric Building, Schenectady, N. Y. Chairman.

BRIEFLY TOLD.

OBITUARY NOTE, THOMAS LATIMER GEORGE.—Some time ago we noted briefly that Mr. Thomas L. George, for some time General Agent of the U. G. I. Company, with headqua rters in the home office, Philadelphia, had joined the great majority. His death occurred the morning of the 21st prox. Deceased was born in Philadelphia, February 1, 1846, and received his education in that city, graduating from the High School in 1864. His first business experience was in the oil trade, through service with the firm of Cochran & Russell. Later on he engaged with his uncle, Mr. J. B. Van Dusen, a well-known coal factor of his day. Sh ortly thereafter the City Gas Trust, under whose direction the supply of gas in Philadelphia was being carried on, appointed him on its accounting staff, and in that department eventually reached the post of Controller. On the passage of the measure, kno wn as the Bullitt Bill, when the gas works' operating division of the Trust came under control of General Louis Wagner, deceased was appointed Chief Bookkeeper and Controller, which dual position he filled until the works operation was taken over by the U. G. I. Co. The Company named him as General Agent, and such he remained to the end. Deceased was a brother of the famous political economist and author, the late Henry George, and held membership in the American Gas Institute, the National Commercial Gas Association and the Illuminating Engineering Society. He was a vestryman in the famous Philadelphia congregation that worships in St. Paul's Epispocal Church, was prominent in the Masonic order for two score years, was affiliated with the Knights of Honor and the Philadelphia Athletic Club, and was on the roll of the U. G. I. Athletic Association. He is survived by his two daughters, three sisters and two brothers. The main facts in this story (for which we are indebted to the courtesy of Mr. T. H. Jackson, now the U. G. I. Company's General Agent), are closed with this simple sentence, one which best tells the regard in which deceased was held: "There was probably no other man in Philadelphia who had a more extensive acquaintance, or who was more universally respected and beloved."

THE PAPER LIST, FIFTH ANNUAL CONVENTION, ILLUMINATING ENGINEERING SOCIETY.—The executives of the Illuminating Engineering Society are to be congratulated over the number and subject matter of the papers which are down for consideration at the fifth convention of that body, to be brought off in Chicago, during the week beginning Monday next. President Kennelly—the well-known and much-liked Harvard instructor—and General Secretary Millar, have done other things wisely and well with the preliminaries in respect of the outing times. The forerunners of latter promise a reception and dance in the Florentine room of the Congress Hotel, and a series of automobile "drives" for divers times in the sessions—morning afternoon and evening. The banquet is set for the evening of Wednesday the 27th. The paper text is appended:

Presidential Address, "The Relations of Physico-Physiological Research to Illuminating Engineering," by Dr. A. E. Kennelly.

Report of Committee on Nomenclature and Standards, by Mr. A. C. Humphreys, Chairman.

Report of Committee on Progress, by Dr. Louis Bell, Chairman.

"Symposium on Illuminating Glassware," by Messrs. Bassett Jones, Jr.; A. J. Marshall, L. W. Young, C. H. McCormick.

"The Manufacture of Glass from the Viewpoint of the Illuminating Engineer," by Mr. E. H. Bostock.

"An Analysis of the Requirements of Modern Reflector Design," by Mr. F, L. Godinez.

"Recent Small Gas Lighting Units," by Mr. F. H. Gilpin.

"Flames Carrying Electric Current," by Mr. C. H. Lorenz.

"The Production of Natural Gas from the Illuminating Engineer's Standpoint," by Mr. G. H. Barrows.

"Recent Developments in the Manufacture of Incandescent Lamps," by Mr. J. E. Randall.

"The New Quartz Tube Mercury Arc Lamp," by Mr. Geo. C. Keech.

"The Law of Conservation as Applied to Illumination Calculations," by Dr. A. S. McAllister.

"The Photometry of Lighting Units of High Intensity," by Messrs. Geo. H. Stickney and S. L. E. Rose.

"Photometry at Low Intensities," by Dr. Louis Bell.

"Evalution of Lamp Life," by Messrs. P. S. Millar and L. J. Lewinson.

"Distribution of Luminosity in Nature," by Dr. H. E. Ives.

"Light Distribution: Its Influence Upon Illuminating Efficiency and Visual Acuity," by Mr. A. J. Sweet.

"Resume of Legislative Enactments on Illumination," by Mr. E. L. Elliott.

"Selling Illumination," by Mr. F. B. Rae.

(Title to be announced later), by Mr. J. R. Cravath.

(*Continued from page* 183.)

Operating Revenues.	Gross.	Per 1,000 Cu. Ft. Sold.
Sales—Municipal street lighting	$5,636.86	$0.75
" light, heat and power	1,732.80	0.75
Commercial sales	213,321.96	1.05
Gross gas sales	$220,691.62	$1.0321
Less discount and allowances	2,934.21	0.0137
Net gas sales	$217,757.41	$1.0184
Miscellaneous revenue	7,174.16	0.0336
Total operating revenues	$224,931.57	$1.0520
Operating Expenses.		
Total producing expense	$64,160.53	$0.30100
" distribution "	13,198.40	0.0617
" commercial "	20,771.72	0.0971
" general "	10,497.40	0.0491
Total operating expenses	$108,628.05	$0.5080
Amortization of fixed capital	26,364.21	0.1233
Taxes	12,389.83	0.0580
Uncollectible bills	983.22	0.0046
Total revenue deductions	$148,365.31	$0.6939
Operating income	$76,566.26	$0.3581
Other income—rentals	604.46	0.0028
Gross income	$77,170.72	$0.3609

According to the above table, which has been prepared from the reports of the Company, the income derived from the operation of the plant during the year 1910, after paying operating expenses and taxes and setting aside over $26,000 for depreciation, was $77,170. Two questions are immediately suggested: Does this amount represent the true return upon the investment or the fair value of the property? Is it in excess of a fair return thereon?

Before these questions can be answered, one must determine whether the plant has been operated with reasonable efficiency and whether the plant is of such a character and in such condition as to permit gas to be produced at a reasonable cost. It is obvious that if a plant is so constructed that an unusual amount of gas must be lost, or produced only at a great cost, or if the management is inefficient, or if for any other reason expenses are inflated beyond fair cost, the reasonableness of a rate should not be determined by the results of such operation. A fair rate presumes a well-designed and well-managed plant, and if the Company does not meet the requirements in this regard, it may not justify the rates that it charges, although under such conditions they may not permit a fair return to be paid upon the investment or cost of the property.

The first factor to be considered is the amount of gas lost, more properly called "unaccounted-for gas." The percentage for the year 1910 was 11.2, which is about the average for the last 5 years and slightly less than for the year 1909. At first glance this percentage seems high and undoubtedly should be reduced, but in view of the local conditions under which the Company operates, the percentage may be allowed to stand without modification. A considerable portion of the area is sparsely settled, and, in Coney Island particularly, the consumption during the greater part of the year is comparatively small. Mains have been built through districts where there is practically no demand for gas in order to reach territory where there is considerable demand. These mains must be supplied with gas throughout the year, and the condensation is necessarily high and the leakage abnormal. It is not reasonable to expect that a company operating under such conditions would show a percentage of loss as low as a company which operates in a populous area having a steady demand.

An analysis of operating expenses, omitting for the moment all reference to depreciation, does not indicate that the administration is inefficient. During the last 7 years operating costs show a marked decrease. Taxes have increased, but notwithstanding, the total cost, including taxes and uncollectible bills, but excluding depreciation, has decreased nearly 20 cents since 1904. In 1910 it was nearly 7 cents less than in 1909, when it was over 6 cents less than in 1908. A mere reduction in operating cost does not prove efficiency, but it certainly is a favorable sign. An analysis of the details which make up operating cost seems to indicate that, while certain figures might be criticised, the total is about what an efficient company would have been called upon to spend in the area in question.

Special reference should be made to depreciation, for in past years certain companies have set aside inadequate amounts, and in order to make up those delinquencies unusually large appropriations have been made during the last year or two. If a company has not maintained its plant and made adequate provision for depreciation, it should do so at the earliest possible moment and should offset its failure to do so in the past by larger appropriations in future years. It is not proper in rate cases, however, to consider as a charge against the current year an amount which is in excess of the sum required to offset average depreciation or that which accrues during that year. If this were done, it would be just as proper for a company to neglect to charge into operating expenses the cost of coal and oil during some one year, to declare dividends because of such procedure and then, during another year, when a rate case was pending, to charge into the operating expenses of that year the cost of coal and oil for a preceding year.

During 1910 the Company set aside, to meet depreciation, $26,364.21 over and above the actual expenditures during that year for maintenance and repairs. It may be larger than necessary under normal conditions, for if the depreciation allowances were placed in a fund and accumulated at compound interest, a smaller amount would be adequate. But as no provision was made for other reserves, it may be considered to cover them as well.

Estimated Results for 1911.—The year 1911 will undoubtedly show improvement over 1910. In preparing an estimate, the first essential factor is the probable consumption. In 1910 the amount of gas sold was 20 per cent. greater than that in 1909, and 1909 exceeded 1908 by about 15 per cent. The output for the first 6 months of 1911 exceeds the same period in 1910 over 17 per cent. It would not seem unreasonable, therefore, to estimate a total increase in 1911 of at least 14 per cent., allowing for the recent fire at Coney Island and its effect upon consumption. According to the officials of the Brooklyn Borough Company, the amount of gas unaccounted-for during the current year will probably be reduced to 10 per cent. Hence, the total amount made will be approximately 270,835,000, and the total amount sold will be 243,751,000 cubic feet.

Operating costs as a whole should show a material decrease for the current year. For 1910, omitting depreciation, the total cost to cover operating expenses, taxes and uncollectible bills was 57.06 cents per 1,000. The Company claims that allowance should be made for an increase in taxes, for additional insurance (adequate provision not having been made last year), and also for larger general expenses to pay the officers adequate salaries. Upon the other hand certain expenses, such as the cost of oil, should decrease, and increased consumption should mean a reduction per unit sold even though there might not be an absolute reduction in the gross amount. It would be unfair not to allow the Company some of the gain which comes from increased efficiency, particularly when the management is more than normally efficient. In our opinion, therefore, the fair amount to be allowed to cover operating expenses, taxes and uncollectible bills, excluding depreciation, for the year 1911, would be from 58 to 60 cents per 1,000 sold. The allowance for depreciation, and other reserves over and above actual expenses for maintenance and repairs, may be assumed for the purposes of the present case at 10 cents per 1,000, making a total cost of 68 or 70 cents. Upon the basis of $1 per 1,000 cubic feet of gas sold to private consumers, the income per 1,000 would probably be $1, including minor receipts from miscellaneous sources. Subtracting operating expenses of 68 or 70 cents, the net profits from gas sales, etc., would be 30 to 32 cents per 1,000. Upon the basis of the consumption estimated above, the gross amount would be $75,563, at 31 cents, and $78,000 at 32 cents per 1,000.

If these estimates are correct, it is evident that the gross income of the Company in 1911, upon the basis of $1 per 1,000 cubic feet of gas sold, would be substantially the same as it was in 1910, when the rate was $1.05 per 1,000 to private consumers.

Appraisal of Physical Property.—As the records of the Company did not conclusively show either the present value of the property or the amount of unimpaired investment which it represents, the transportation department of the Commission, under the direction of Mr. E. G. Connette, was directed to prepare an inventory and appraisal of the property. The Company willingly assisted and permitted a thorough examination to be made, not only of the property but of the records showing actual cost. The unit prices were fixed after an examination of these records and comparison with prices of well-known manufacturers and contractors for the past 5 years. They are somewhat in excess of the amounts actually paid, and, with

the exception of two or three instances, have not been criticized by the officials of the Company.

Upon the basis of this inventory and these unit figures, Mr. Connette estimated that the net cost of all physical property upon December 31, 1910, exclusive of land, was $916,154. This estimate covers the cost of labor and materials, sub-contractors' profit where proper and necessary, and such allowance for engineering, supervision, etc., as the sub-contractor ordinarily includes in his charges.

To this amount, which is commonly called "net cost," an allowance should be added for general engineering, supervision, administration, contingencies, incidentals and a general contractor's profit where customary and necessary. The total allowance for these items suggested by Mr. Connette was $202,201. This amount is certainly not too small, and may be too large, even if it does cover city and state permits and fees, property owners' consents, legal expenses, printing, storeroom expenses, incomplete inventories, loss during construction, etc. This subject was discussed in the opinion rendered in the matter of the gas and electric rates charged by the Queens Borough Gas and Electric Company, decided June 23, 1911, and what was then stated need not be repeated here.

Mr. Connette estimated accrued depreciation upon December 31, 1910, at $222,379 upon the basis of the expired life of the various portions of the property, as shown by the records of the Company, and the life tables of the property used in other cases, with such modifications as were considered necessary in view of the local conditions. As in the Queens Borough case above referred to, this estimate includes depreciation due to wear-and-tear and age, but does not include full allowance for future changes in the art and the abandonment or supersession of property, because it will become inadequate before being worn out. Judging from experience, therefore, the above estimate is probably too low. As the same data have been used to determine the amount which should be subtracted from earnings to represent accruing depreciation in a single year, the annual payment is too low. But if the above estimate is too low, then present value is too high, and the amount to be accepted as fair value of the property should be reduced. However, if a different basis were used for computing accrued depreciation and the annual allowance therefor, the final result would not be affected. It is not necessary, therefore, to consider in this case the propriety of adopting the straight line method as compared with the various other theories that might be advanced. Subtracting the accrued depreciation, as estimated by Mr. Connette, the present value of the physical property, exclusive of land, would be $895,976.

In the main these estimates were not objected to by the officials of the Company. The two items which they urged most strongly should be increased were mains and services. They maintained that the estimates of Mr. Connette were about $55,000 too low. No figures of actual cost were produced to support the claim, and the Commission assumes, without deciding, that the claim is not well founded.

When the property was appraised, the Brooklyn Borough Company had two generating stations. One was old and not in use; the other was modern and furnished gas for the whole area. The former was appraised at approximately $88,000, exclusive of land. It is the avowed purpose of the Company to dismantle this plant, to remove a holder to the new site, to sell the land and such portions of the equipment as have value, and to use the new plant as the sole generating station of the Company. In view of these facts, the question naturally arises whether property which has not been in use since the spring of 1909, and is not intended to be used, should be included as a part of the property upon which the Company is entitled to earn a fair return. Closely associated with this question is the request of the Company that allowance should be made for additions to the new plant, which they estimate will cost approximately $60,000. It is evident that it would be unfair to include a plant which is not in use or intended to be used, and also the new plant to take its place, for that would be equivalent to capitalizing replacements. The additions are not to replace physically the abandoned plant, for they are to be built at another place. But, as far as purpose and use are concerned, they are to take the place of the abandoned plant, and, therefore, are in reality replacements and not additions.

What the old plant will sell for is uncertain. Apart from the land, it would have some value. and if part of the equipment could be sold to other gas companies, or removed to another place and utilized by the present Company, it would have a value greater than if sold for scrap. It is possible that the utilization of the old plant and the sale of such portions as cannot be utilized by the Company, would produce a sufficient amount to pay for the proposed additions, in which case the estimate of Mr. Connette would be reduced by the subtraction of $88,000 to represent the old plant, and the addition of $60,000 to represent the cost of the additions, or a net reduction of about $28,000.

The appraisal of the physical property also includes the estimated value of paving over mains and services as they stood December 31, 1910, representing approximately $60,000 in the present value of the physical property. It is unnecessary for the purpose of the present case to discuss at length this question. We shall assume that the Company is not entitled to collect from gas consumers a rate which will yield a fair return upon paving which the city has placed over its mains and for which the Company has not expended or paid directly or indirectly a single dollar. The engineers of the Commission report that they have been unable thus far to ascertain the expenditures which the Company has been called upon to make in the way of replacing pavement over new mains and services. It is impossible to say, therefore, what portion of the $60,000 should be included in a fair value of the property. It is undoubtedly true, however, that if the estimate of Mr. Connette be reduced by $50,000, the consumer will not be unfairly treated.

Land.—The land owned by the Company consists of two parcels—one upon which the old works are located at West 5th street, the other upon which the new works have been built at West 12th street. The former plant is to be abandoned, and the land is to be sold. The new site is apparently adequate for the future needs of the Company. A considerable portion is unused as yet for gas purposes, and a part is occupied by cottages from which the Company derives rental.

The original cost of both parcels was approximately $60,000, the new site acquired in 1906 having cost about $19,000. The value of both parcels, December 31, 1910, was estimated to be $98,500. This figure was reached by taking the assessed valuation and adding 25 per cent. An appraisal by real estate experts was not considered necessary, as this figure was accepted by the Compaay's representatives.

Several questions arose in connection with this land and the amount to be assigned to land in the "fair value" of the property. If only a portion is necessary for the operation of a gas plant in the 31st Ward, should the consumers be required to pay a rate which will yield a fair return upon the land not needed to serve them? If the principle is adopted that consumers must carry land not actually and necessarily devoted to the purposes of the undertaking, will it not encourage a corporatioa to purchase considerable tracts of land, to foist interest, taxes and other carrying charges upon the consumers, and to reap for itself the gain which comes from the increase in value? Upon the other hand, if a Company is to be strictly limited to such land as it may be fully using to the greatest advantage at the moment a rate case is brought, may not such a policy seriously handicap the future development of the undertaking?

Two methods of dealing with these problems may be suggested. One involves the appraisal of such land as is actually and necessarily used at the present time, leaving the Company free to carry additional land or to make no such provision. If this were done, it would follow that if the Company did purchase land that was not needed at the moment, any profit or loss which would come from such procedure would be a factor not to be considered in a rate case. The Company would be entitled, however, to earn a fair return from some source upon the fair value of the land actually and necessarily used.

The other method requires the appraisal of all land whether used for gas purposes, held in reserve or purchased for other reasons. If this plan were followed, the income from all land, whether from the sale of gas, from rentals or from the increase in value from year to year, would be a part of the income of the company and considered in determining the rate to be charged for gas.

Prudent management may require that land shall be purchased in advance of actual needs, for it may clearly be impossible to secure adjacent property just as it is needed at reasonable terms. Upon the other hand, it would not be wise for the Commission to adopt the policy that a company may speculate in land *ad infinitum* and call upon the gas consumers to pay its losses. Even if they were to share in the profits, it would be unwise, for the purpose of a gas corporation is not speculation in land, but to supply gas to consumers. The distribution of gas is a quasi-public function, and for this reason gas corporations have been given unusual powers. Speculation in land is not such a function. But if a company does acquire more than is immediately necessary, and if such acquisition is reasonable and wise, the consumers who, under such circumstances, must carry the burden, should also share whatever gains may accrue from such

ownership. It is the opinion of the Commission that a company should be allowed reasonable latitude, that it should not be penalized for purchasing land somewhat in advance of its needs and that the resulting revenue or profit, being a necessary adjunct of the distribution of gas, just as the property itself is a part of the gas property, shall be considered part of the income of the company. Other phases of this subject were discussed in the opinion in the Queens Borough case above referred to and need not be repeated here.

Applying these principles to the case in hand, the entire amount of land owned by this Company should not be included among the property upon which the Company is entitled to a fair return from the sale of gas. The Company owns more land than it needs and it intends to sell one parcel. Possibly the other is larger than anticipated needs justify. However, if all land be included in "fair value," and all rentals and increase in value therefrom be placed in the income account, the result in this case will not be materially different from that obtained from the application of the above principles. In view of this fact and the fact that the latter method does not present so many complications, it has been followed in this case, but it may not be considered as fixing a precedent to be followed in other cases. Upon the basis of a present value of $98,500, the annual increase is about $8,300.

Preliminary and Development Expenses.—This subject is also generally discussed in the opinion in the Queens Borough case. Applying the principles therein outlined, it is believed that an allowance of $180,000 is sufficient to cover all preliminary and development expenses, including interest and taxes during construction. In this connection, it should be recalled that Mr. Connette has allowed $202,201 for engineering, supervision, contingencies, incidentals, contractor's profit, etc. The Company has produced no records to show what was actually spent, and it is not to be expected that in the absence of records of actual cost, the Commission will adopt a figure that is large or unreasonable.

Working Capital.—The opinion in the Queens Borough case contains a statement of the general considerations which should determine the amount to be allowed for working capital. Only the special facts applicable to the present case need be stated here.

According to the report of the Brooklyn Borough Company for 1910, it spent during the year for operating expenses and taxes $117,139.54, excluding charges for depreciation and for bad debts which do not call for any outlay on the part of the Company. The average per month was less than $10,000. However, in the two largest months (July and August) these expenditures were approximately $22,000.

According to the balance sheet of December 31, 1910, the Company had materials and supplies on hand which cost $20,168.18. Of this amount, gas making materials amounted to about $6,000, gas merchandise to about $5,000, and the remainder consisted of materials and supplies for repairs and extensions of mains and services. Doubtless a balance sheet for July or August would show a larger amount. City bills are not a serious item in the case of this Company. The total sales to the city amounted to only $7,347.60 for 1910. Even 6 months' arrears would mean not more than $3,700.

Taking into account the fact that the Company purchases materials and supplies on a 30-day basis, all considerations would seem to indicate that working capital to the amount of $35,000 would be adequate, $40,000 would certainly be sufficient. An examination of the financial operations of the Company shows that the Company has not had even $30,000 in constant actual use as working capital.

Going-Concern Value.—In the Queens Borough opinion, this matter was discussed at length. It was there held that no further amount should be added to the value of the physical property beyond what was included in development expense. Value cannot be made by duplication of titles or the multiplication of names. It was also held that whatever provisions should be made to offset pioneer losses or failure to earn profits during a development period of normal length, should be taken into account in fixing the fair rate of return.

Résumé.—The estimates of Mr. Connette for all of the physical property, used and unused, to December 31, 1910, are these given in the report, and these show a total of $1,136,476. Continuing the résumé says:

The amount reached above—practically $1,135,000—may be called, for lack of a better term, the minimum present value of the property upon which the Company is entitled to a fair return. The Commission has not decided that it is the *fair* value of the property; possibly it is less than the fair value. But if the Company has not, and probably will not during 1911, under efficient management, earn a return upon this sum which will warrant a reduction of the rates, there is certainly no need to proceed further in an attempt to determine the fair value. It should be noted that the minimum value of $1,135,000 has been obtained by refusing to allow the claim of the Company for a higher appraisal of mains and services, the value of paving for which the Company has never paid and the plant not in use in 1910 nor to be put in use during 1911.

In order to make comparison with the income for the years 1910 and 1911, the minimum value must be further modified, for it is not fair to compare income for the whole year with value at the *end* of the year; it should rather be the value at the middle of the year, or the average value. The minimum value for 1911 may be taken as $1,135,000, as it includes the additions to the generating station proposed to be made this year. For 1910, a minimum value of $1,110,000 will be assumed. Comparing these amounts with the income for the 2 years, plus the increase in the value of the land, we have:

	1910.	1911.
Income	$77,170	$78,000
Increase in value of land	8,300	8,300
Total	$85,460	$86,300
Minimum value	1,110,000	1,135,000
Percentage of profit	7.7	7.6
Statutory maximum rate per 1,000 cubic feet	$1.05	$1.00

Finding.—It is the opinion of the Commission that *the facts do not at present warrant the issuance of an order reducing the maximum price of gas below* $1. The Company is operating in a sparsely settled area. The business in Coney Island is uncertain and fluctuating; but conditions are improving steadily, and if the results for 1911 should be much more favorable to the Company than anticipated, it is probable that within the near future the improved conditions will warrant a reduction in rates. The complaint should be dismissed without prejudice to a reopening of the matter at a later time either upon complaint or upon the order of the Commission.

Thereupon the Commission issued the following order: Dated Aug. 18, 1911.

"*Ordered*, That the complaint be and the same hereby is in all respects dismissed, without prejudice, however, to a further proceeding. * * * ."

Liability of Gas Companies for Injuries Resulting from Escape of Gas.

[Prepared for the JOURNAL by MR. JOHN EDSON BRADY.]

Concurrent Negligence.—Where the concurrent negligence of two or more persons combined results in an injury to a third person, either of the negligent persons separately, or all of them jointly, are liable to the injured party. The comparative degree of negligence is not taken into consideration. One person may be held liable for the entire damage, although another contributed in a far greater degree to the injury. An excellent illustration of this doctrine of law is found in the case of "Barnes *v.* Masterson;" 38, N. Y., App. Div., 612. It appeared that one person deposited a quantity of sand upon a vacant lot. He then sold the sand to another, who deposited additional sand upon the pile. The weight of the entire pile injured an adjoining wall. It was held that the first person was liable for the entire damage, although his act alone would not have caused the injury.

The undisputed facts in "Koelsch *v.* the Philadelphia Company;" 152 Pa., 355, 25 Atl. Rep., 522, were that the plaintiff's house, which was supplied with gas by the defendant Company, was wrecked, the plaintiff and several members of his family being injured by an explosion of gas which had accumulated in the cellar. The plaintiff claimed that the gas escaping from a leak in the defendant's main found its way through the shale and rock, of which the street was constructed at that point, into the cellar of his house. The defendant denied that the gas escaped from its main, but had found its way into the plaintiff's cellar in the manner described, and alleged that the leak occurred in the plaintiff's own pipe, for the existence of which he alone was responsible. There was, it developed, sufficient evidence to sustain the plaintiff's theory as to the escape of the gas.

It further appeared that the explosion followed the lighting of a match in the cellar by a stranger; that is, one not an employee of the Company and not acting on behalf of, or as agent of the plaintiff. The Company claimed that the explosion was due, not to its negligence, but to the negligence of this stranger, and that it, therefore, was not liable to the plaintiff. It was held that this was a case of concurrent negligence. "In such cases," said the court, "the injured party has his redress against either of the wrongdoers (the Gas Company or the stranger), or both, at his election."

Imputed Negligence.—The doctrine of imputed negligence is sometimes invoked in cases involving gas company liabilities. Where, for instance, a gas company has been guilty of negligence, it may claim that, although the injured party was not negligent, there was negligence on the part of a third person which is imputable to the injured party, thus preventing the latter from recovering damages.

The rule is thus stated in VII. Cyc., 542: "In order that the concurrent negligence of a third person can be interposed to shield another, whose negligence has caused an injury to one who was without fault, the injured person and the one whose negligence contributed to the injury must have sustained such a relation to each other, in respect to the matter then in progress, that in contemplation of law the negligent act of the third person was, upon the principle of agency, or co-operation in a joint or common enterprise, the act of the person injured, or the relation between the person injured and the one whose negligence contributed to the injury must have been such that the latter was bound to care for and protect the former. The doctrine of imputed negligence is not recognized in Illinois, and has been repudiated in Ohio; and in Nebraska it is restricted to the relations of partnership, principal and agent, and master and servant.

In "Consolidated Gas Company, of Baltimore, *v.* Getty;" 96 Md., 683, 54 Atl. Rep., 660, an explosion of gas in the cellar of a house fol-

lowed the attempt of a policeman to locate with a lighted candle the place where the gas was escaping. It was claimed that the policeman was guilty of contributory negligence in searching for escaping gas with a torch, and that this negligence was imputable to the owner of the house, which latter was extensively damaged by the explosion. It was held that the negligence, if there was any, was that of the policeman, and that it could not be imputed to the owner of the house. The police officer was not the agent, servant or employee of the owner, and the latter was not in any way responsible for his actions. The negligence of a third party, who is an entire stranger to the party injured, cannot be imputed to the latter.

In "Baudler *v.* Peoples Gas Light and Coke Company;" 108, Ills., 187, the plaintiff was injured by an explosion of gas in the cellar of his house, which attended the lighting of a match by his wife, the two being in the cellar for the purpose of locating a leakage of gas. The court with reference to the matter of charging the plaintiff with his wife's act in lighting the match, said: "We need not enter upon the vexed question as to how far he was responsible for the act of his wife in lighting the match. It is but a presumption that he knew she was going to light it, arising from the fact that they jointly went into the cellar to ascertain the cause of their discomfort. The evidence fails to show in direct terms that he knew what she was about to do. She was not necessarily his servant, nor is he conclusively presumed to be responsible for acts she might commit without his knowledge. Her contributory negligence cannot be visited upon the plaintiff unless she was at the time his servant or agent."

Evidence.—The rules of evidence which apply to the trials of actions in general are applicable when a gas company is one of the parties.

In the case of "Powers *v.* Boston Gas Light Company;" 158, Mass., 257, the action was brought to recover damages for the death of one Lydon, an employee of a steam heating company in the city of Boston. The death was caused by an explosion of gas manufactured by the defendant Gas Company, which had escaped into a manhole belonging to the steam heating company. At the time of the accident Lydon was inspecting the manhole in the course of his employment, the gas being ignited by a lantern which he carried. The jury brought in a verdict for the defendant. At the trial the defendant Company, in order to show the system and manner in which it carried on business, introduced evidence that it had, in the streets of Boston, gas pipes measuring about 250 miles; that the laying and repairing of these pipes were managed by the street department; that the assistant superintendent was always at the Company's office at night: that it had also in its employ a body of men called jobbers, whose business it was to attend to all complaints and notices of leaks, and to repair small leaks in houses; that several of them were stationed night and day at the office for the purpose of receiving and acting upon such notices, and that it had in its mains 7,000 or 8,000 valves, so arranged that the gas could be cut off from the pipes within a few minutes of the arrival of the men on the spot.

For the purpose of showing due care on the part of the defendant Company in the general management of its business, and as a part of its system, the Company was allowed to introduce the following notice:

"Notice to gas consumers.—Important.—The gas pipes in the streets are liable to be broken by the settlement of the streets after any disturbance of the soil, and in cases of leaks of gas from the street pipes an examination of the burners in the building will not disclose the cause or locality of the leak. As is well known, many of the streets of this city have recently been dug up by the Telephone Company, Electric Light Company, Steam Heating Company and Bay State Gas Company. The Boston Gas Light Company hereby calls your attention to the fact, and, in order to prevent accidents from explosions or inhalations of its gas, requests your strict compliance with the following rules: 1. As soon as a smell of gas is perceived, either by day or night, immediate notice should be sent to the office of the Company, No. 24 West street; 2, no light should be taken into any room where there is a smell of gas, and no match should be lighted; 3, the windows in any room where gas is perceived should be opened at once, and kept open. The attention of all your employees should be called to these rules at once and a careful compliance with them should be enforced." It appeared that notices similar to the one introduced in evidence were delivered along the route where the accident occurred by the collectors of the defendant Company some time previous to the accident. There was, however, no evidence as to whether one of these notices was delivered to the steam heating company, which was not one of the defendant's customers, or whether the notice came to the attention of Lydon.

The plaintiff took exception to the admission of this evidence, and appealed from the judgment in favor of the Company on the ground that the evidence should not have been admitted. On the appeal it was held that the evidence was properly admitted. Said the court: "The issue whether the defendant was negligent in the conduct of its business was raised, and upon this issue a wide range of evidence was relevant and material. This results from the nature and extent of the business which the Legislature has authorized the defendant to transact. The supply of gas to a city like Boston requires the maintenance of many miles of mains, at any point of which a leak is liable to occur. Practically it is no more possible for a gas company to so arrange its mains, or to have such a force of servants, that all leaks shall be discovered as soon as they occur, than for a city or town constantly to keep all of its highways in perfect repair. In both cases it is well settled that evidences of what precaution were actually taken, and of what means were actually employed to discharge the duties imposed is relevant and admissible."

As to the admissibility of the notice, it was said: "The question whether the defendant was at fault is one to be determined upon a view of its system and manner of doing business, so far as that is relevant to the alleged negligence. The notice issued by the defendant to gas consumers, calling attention to the liability of leaks from the digging up of the streets by various corporations, which was distributed by its agents, was relevant."

Not only was this evidence relevant, but it undoubtedly carried considerable weight in convincing the jury that the Gas Company was not lax in the performance of its duties.

On the trial of an action against a gas company for damages based on an explosion of gas, which escaped from one of the company's pipes, one of the company's witnesses was asked if he could tell by looking at a pipe whether or not it would convey gas. The company objected on the ground that the evidence called for was immaterial. The witness was nevertheless directed to answer. It does not appear in the report of the case whether his accomplishments included the power of judging the gas conveying quality of a pipe by merely looking at it; but, on appeal, it was urged on behalf of the company that the admission of this testimony was ground for a reversal of a verdict found against the Company. It was held that, even if the testimony should not have been admitted, no possible prejudice resulted from permitting the witness to answer. The verdict was not reversed. "United Oil Company *v.* Miller;" Col., 73 Pac. Rep., 627.

The Petroleum Trade of India.

Mr. Noel Paton, writing on the trade of India during the past year, as printed in *Petroleum Review*, the imports of mineral oils in 1910-11 had a total value of $11,293,500, as against $10,159,000 in 1909-10. Of the total quantity imported in 1910-11, 70 per cent. was kerosene, which by itself amounted to 56,600,000 gallons, with a value of $7,947,500, as compared with 64,050,000 gallons with a value of $8,370,500 in 1909-10. The decrease was 11.6 per cent. in quantity and 5 per cent. in value.

The following statement shows the quantity and value of kerosene imported in each of the last two years. The imports into India proper from Burma are added at the foot:

	Quantity in Thousands of Gallons.		Value in Thousands of Dollars.	
United States	41,259	35,292	5,980	5,080
Roumania	1,229	....	826	....
Straits Settlements	6,577	2,090	590	265
Sumatra	4,692	5,882	575	820
Borneo	6,985	7,469	775	980
Russia	3,304	5,842	460	530
Other foreign countries	4	23	....	5
Total foreign countries	64,050	34,598	8,370	7,950
Coastwise from Burma	81,275	91,868	8,425	10,670

The year's trade has been notable for the rate war which broke out in August between the Standard and "Shell" interests and involved Burman companies. The popular belief is that the conflict resulted from over-production, from the appearance of new competitors and from subsequent jealousy regarding supposed or expected encroachments on the spheres of conventional rights of the respective companies. The aggregate reduction of rates from August 15 to the end of March ranged approximately from 9 to 19 per cent. This, of course, does not mean that the loss over the trade at that period amounted to 9 to 19 per cent., for the fall of prices was gradual and irregular. It is more difficult to ascertain whether the reduction of price has induced expanded consumption. Opinions on the subject differ, and comparison with past years is vitiated by the heavy speculative buying that took place during the 6 weeks' rate war in March-April, 1909. But, if an average be struck on the 2 years, 1909 and 1910, one finds a weekly consumption of about 330,000 units of 2 tins, or 8 gallons, against which it has been estimated that the consumption for the first 17 weeks of 1911 has been at the rate of about 344,000 units. There have been rumors of peace, and, after the closing the financial year, recoveries of rate were noticeable in some quarters; but the flotation of new companies, not only in India but elsewhere, complicates any proposals for agreement. In India alone 17 new companies were registered in 1910-11 for the production of petroleum, 8 with rupee capital and 9 with sterling capital, the total figure representing about $18,767,000. It cannot be asserted that saturation point has been reached; but, on the whole, it is surprising that low rates prevalent since August, 1910, did not more greatly stimulate consumption, and the inference probably is that there is a limit to the supply available at low prices. The quantity is less by something like 26,983,000 gallons than was recorded in 1908-09, but that year's trade, as has already been stated, was largely swelled by speculative purchases during the short rate war that occurred towards its close.

From the figures given above it will appear that, excluding Burma's unascertainable internal consumption of indigenous oil, India has, on the average of the last 2 years, absorbed kerosene at the rate of 146,900,000 gallons per annum. The decrease in the total imports from foreign countries in 1910-11 was 7,450,000 gallons or 11.6 per cent., while the increase in visible consumption was 3,250,000 gallons or 2.2 per cent.

In 1909-10 Burma oil formed 56 per cent. of the total visible consumption, and her share seems to have advanced to 62 per cent. as a result of an expansion in her shipments concurrently with a heavy decline in imports. The advance in shipments from Burma to India was one of 13 per cent. in quantity and 31 per cent. in value.

The share in the United States in the visible consumption in the last 2 years was 26 per cent., and her share in the foreign imports of the year under review is 62.4 per cent., as compared with 64.4 per cent. in 1909-10. In 1910-11 she decreased her shipments by 5,967,553 gallons, or 14.4 per cent., and by a sum of $820,500.

It would probably be well to group Borneo, Sumatra, and the Straits Settlements; and if this be done the group takes second place, contributing 11.5 per cent. of the visible consumption in the last 2 years and 27.3 per cent. in the imports of 1910-11. It is impossible to say as yet how much of the shipments by way of the Straits Settlements came from each of the other sources in this group; so no purpose would be served by specific analysis. The decline in receipts from this group of sources was 2,813,772 gallons in quantity (15.4 per cent.), but the value increased by $187,500.

The share of Russia in the visible consumption is 3.9 per cent., and in the last year's imports 10.3 per cent. Her improvement was one of 2,538,200 gallons or 76.8 per cent. and of $337,500. Russia's contribution was 5,841,988 gallons and $797,400, against 3,303,788 gallons and $472,500 in 1909-10.

In 1909-10 Roumania sent 1,230,000 gallons of kerosene oil, while in the year under review it does not figure at all.

Bulk oil formed 78.2 per cent. of the total foreign imports, in place of 74.7 per cent. in 1909-10, the total quantity received in this form being 44,258,781 gallons as against some 47,830,000 gallons in 1909-10 and 61,030,000 gallons in 1908-9. Of the total America supplied 52 per cent., Russia 13 2 per cent., and Sumatra, Borneo, and the Straits together 34.8 per cent.

The remaining 21.8 per cent. of the whole was case oil. The quantity was 12,338,953 gallons, and of this America supplied 99.6 per cent., and Sumatra, Borneo, and the Straits .015 per cent. The increase in the price was due to the enhancement of duty on kerosene oil towards the close of 1909-10.

Imports of fuel oil, on the other hand, made a striking advance from 1,481,424 gallons to 7,102,008 gallons, with a value of $297,500. The causes of so large an increase in this particular year may remain the subject of conjecture. Of this, 43 per cent. came from Borneo and 47.7 per cent. from the Straits as entrepot. Bombay, which in 1909-10 took 673,162 gallons, increased this by 40.3 per cent. in 1910-11 and took 944,327 gallons. Madras also took 278,769 gallons more than in 1909-10, and her total rose to 842,666 gallons as compared with 563,897 gallons; while Bengal made a great stride with 1,527,555 gallons against 244,351 gallons during the previous year. Karachi has ceased to import, while Burma for the first time appeared as buyer and took 3,787,460 gallons, valued at $140,000.

Imports of other mineral oils, mainly for lubricating, advanced from 11,946.392 gallons to 15,951,710 gallons or 35.5 per cent., and imports from Burma into India proper increased by 6.4 per cent. to 4,634,800 gallons.

Management & Commercial Methods.

THE OLDHAM GAS CONDENSER.—We illustrate herewith a device that is being marketed in this city by the Automatic Perfection Company, of which rather oddly-named concern Mr. Theodore G. Fischel is Manager. That this oddity of nomenclature seems a habit with the Company would look further sustained in the naming of the device itself. However, the naming will not be of great account if the device realizes the aims of its sponsors, and this we are assured it is doing. "Concentrator" would seem a better titling, since it is the tendency or way of the device to concentrate the heat under a given point. The pictures tell the story of its operation so plainly that verbiage here in explanation is unnecessary, wherefore it is suggested that if cheapness and simplicity count as moving factors, the Oldham Gas Condenser should go fast into use. The device is well-known in England, where many thousands are in use.

Fig. 1.

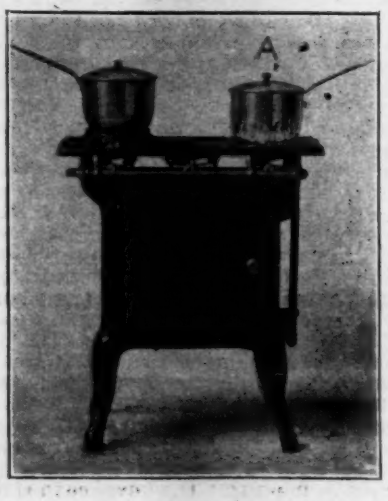

Fig 2.

Items of Interest
FROM VARIOUS LOCALITIES.

THE result of the special election, held in Charlottesville, Va., the 5th inst., for the purpose of approving or rejecting a resolution of the City Council to issue $26,000 in bonds, the receipts therefrom to be used in remodelling the city gas plant, and extending the main system thereof, was largely in the affirmative. Superintendent Hantzmon is our authority for the thought that, when the betterments outlined have been completed, it is likely the Trustees will be enabled to put the selling rate at $1 per 1,000.

THE Laclede-Christy Clay Products Company, of St. Louis, has removed its Chicago offices to a suite in the office building of the Peoples Gas Light and Coke Company. The Company's quarters are most attractive ones, and Mr. F. L. Bunton, who is in charge, extends an invitation to visiting gas men to inspect personally the quarters over which he presides.

MR. CHARLES H. JUMPER, Chemical Engineer to the corporation of Arthur D. Little (Inc.) Chemist and Engineers, Boston, Mass., will act as assistant to Mr. C. D. Randall, in the centralized testing department which has recently been organized under Mr. Randall's direction by the above-mentioned concern. Mr. Jumper has had several years' experience in both the chemical and engineering business of the Company from which he is detailed. This was preceded by quite a service in the testing department of the Pennsylvania and Union Pacific Railroads.

MR. F. A. THORLING has been appointed Purchasing Agent for Messrs. W. S. Barstow & Co., 50 Pine street, New York city. Mr. Thorling has occupied a similar position with a large manufacturing company for a number of years, wherefore it is quite in order that he will prove a decided accession to the Barstow forces.

PRESIDENT HENRY A. HALE, of the Salem (Mass.) Gas Company, announces that hereafter the selling rate for gas, in the Salem and Peabody districts, will rule at $1 per 1,000 instead of the former price of $1.10 per 1,000. This action is the sequel to the Company's promise of some months ago, that when the betterments then underway on the generating plant were completed the rate schedule would be revised. The Company was not moved in the slightest to this action by or through any proceedings instituted by Mayor Rufus D. Adams and the City Council of Salem.

"D. D. M.," writing from North Adams, Mass., under date of the 9th inst., says: Dear JOURNAL—I thought you might like to print the fact that earlier in the week the special committee of the City Council, appointed last February, to consider and report on the good policy of installing a gas and electric lighting plant, to be operated on municipal account, submitted this unanimous report: "That the present is not an opportune time to attempt to secure control of the North Adams Gas Light Company." It further finds that the inopportunity principally lodges in the fact that under the existing law the 2½ per cent. on the city valuation that could be raised to pay for the property would not be close enough to the cost of purchasing it; further, the thought is advanced that the electrical development now going on in the Deerfield Valley may give greater opportunities to the city in the near future. The investigators, however, stick close to firm belief in the abstract of the golden plan of municipal ownership, remarking that their recommendation of to-day 'is solely one of expediency.'" "Expediency," thou art a precious stone.

"M. R. M., writing from writing from Baltimore, Md., under date of the 8th inst., says that the Frederick (Md.) Gas and Electric Company is now completely in the possession of the Frederick Railrord Company. He also adds that no changes in the management of the Gas Company are at present under contemplation.

MANAGER F. P. WAY, of the Albuquerque (New Mexico) Gas, Electric Light and Power Company, recently spent a fortnight or so in old Mexico City and surroundings. He, naturally enough, was inclined to look for evidences concerning revolutions and the like, but the only *real* matter in that line brought out was the way in which the Mexico City Gas Company was revolutionizing the ways and means for cooking in the kitchens of the senors and the shacks of the peons.

IT is with considerable surprise that we learned of the resignation of Mr. John C. D. Clark from the position of Commercial Agent to

the Peoples Gas Light and Coke Company, of Chicago, a position which he filled with profit to the Company and with credit to himself for a long period. Prior to going with the Peoples Company, if we mistake not, he had served the Laclede Gas Light Company with fidelity and success. Mr. Clark proposes to engage in business on personal account as a consulting commercial expert, and we understand he enters his enlarged field with retainers from a dozen or more small companies. And in all heartiness we wish him success good and plenty, and in the further belief that success in such measure will be his from the start.

"T. F. F.," writing from Whitman, Mass., "as of the 6th inst.," incloses this mention: "Some evenings back Mr. C. G. Goeltz, Manager of the Old Colony Gas Company, at its station in Braintree, was decidedly surprised by an incursion in the shape of an unannounced visit at his home, 57 Farm street, East Braintree, of a score or more of the Company's men. Arriving in front of his residence one of the visitors sounded a blast on a horn, the echoings of which must have caused Goeltz to think that a fire was on in his eaves. Hurrying to the vestibule he was just in time to welcome 6 of his tried and true, who were gingerly carrying a handsome specimen of the chair genus known as 'Morris.' Tenderly placing the 'Morris' on the floor of the parlor, a spokesman (meanwhile the guests had increased to 20) presented the chair to Mr. Goeltz as a token that, when he rested from his labors, he should rest easily and well. Poor Goeltz replied as best he could, and he did pretty well at that. The score or more held in their number 6 men, who, equipped with instruments, rendered dulcet orchestral strains at appropriate intervals. Refreshments were pleasing interludes, and when good-byes were spoken, it is almost a sure thing that Goeltz was in condition to tryout the Morris resting apparatus."

THE petition of the Waterbury (Conn.) Gas Light Company, for permission and sanction to extend its distributing lines to and through Middlebury and Watertown, was recently considered in the Connecticut House of Representatives. The sanction was given in respect of Middlebury, but a negative return was made in respect of Watertown. A separate Company has the right of way for the gas supply of the latter.

THE General Assembly of Connecticut has granted a charter for the operation of the Terryville Gas Company, with leave to operate in the neighboring section of Plymouth. Those interested are Messrs. F. A. Scott, E. G. Austin, T. P. Higgins, H. N. Wilcox and A. W. Grannis.

AT a special meeting of the shareholders in the Meriden (Conn.) Gas Light Company, held to take suitable action respecting the death of Mr. Walter Hubbard, the following resolution was adopted:

Whereas, Walter Hubbard, for more than 17 years the President of this corporation, died the 24th day of August, 1911; therefore, be it

Resolved, That in the death of Mr. Hubbard this corporation has sustained a serious loss.

His active and unflagging interest in its welfare, the wise counsel so cheerfully and freely given, the loyalty to all its interests, manifested in numerous ways, will be sadly missed by his associates.

Resolved, That these resolutions be spread at length upon the records of this corporation, and that a copy of same, suitably engrossed, be transferred to his family.

HAVING declared that the increased tax rate for some time effective, under which taxes are paid to the State, the National Government and the local authorities, has gotten to the point where it is impossible for it to transact business save at a loss, the Union Gas and Electric Company has filed with the Ohio Public Service Commission a schedule of the rates it proposes hereafter to charge for a natural gas supply. This puts it up to the Commission to determine whether or not the Company may charge a minimum rate of 30 cents per 1,000 cubic feet. The plea was prepared by Mr. Joseph Heintzman, the the Company's attorney, and it does not appear at all unseemly to here congratulate him on his clever presentation of the facts.

THE Washington (D. C.) Gas Light Company has been served with notices concerning the filing against it of three damage suits, under which reprisals amounting in total to $30,000 are claimed. The suits are brought before the District Supreme Court, and are entered on behalf of one Edward Casson and an infant, or minor son. Complainants charge negligence of the corporation, resulting in an explosion of gas in their home, 1220 North Capitol street, the morning of July 3d, which caused much physical damage to them and serious loss from the viewpoint of property loss. Workmen, it is averred, while installing gas fixtures failed to cap a supply pipe. The gas odor finally attracted Casson's attention, and, searching for it in the way usually common to people of his class, found it, unfortunately.

MR. W. C. LAMBERT, of the legal division of the city's executives, Omaha, Neb., asked some days ago that the State Railway Commission be instructed to value the property of the Omaha Gas Company; and the Commission having been so asked declined flatly on the ground that it lacked jurisdiction. The application was made in connection with the valuation of the property, made as a part of the evidence to be used in the hearing on the injunction against the dollar gas ordinance. The Railway Commission does admit that it stands ready to recommend some person qualified to make an investigation independent of the city, as to the valuations made by the city, but would not accept responsibility for his conclusions. A precedent was established for the refusal when, at an earlier time, the Commission was appealed to for the valuing of the electric lighting plant in Aurora, Neb.

THE *Public Ledger* of Philadelphia, declares that the earnings of the United Gas Improvement Company, for the 6 months ended June 30th, last, were these:

	Titlings of Accounts	Increase over like Period, 1910.
Net earnings	$3,335,604	$74,818
Dividends	2,220,118	101,364
Sinking fund	365,178	6,745
Balance	750,368	*33,291

*The net earnings before deduction of sinking fund and payments represent 6.61 per cent. on $51,60',950 capital stock, or a rate of 12.62 per cent. per annum.

THE Washington (D. C.) *Star* says that the Naval Engineering Bureau is contemplating the construction of a vessel equipped with gas producer engines, which, it is claimed, as a means of propulsion, are as far superior to turbines as the latter were to the old type of the reciprocating engines. It all depends upon the willingness of the general makers of gas engines to co-operate with the shipbuilders. Owing to the lack of funds for experimental purposes, the Navy Department is obliged to rely upon private builders of ships and machinery to carry out any novel idea such as this. It is proposed to invite bids for the construction of a submarine boat tender, a vessel probably less than 1,000 tons displacement, and the bidders will be invited to submit proposals for placing gas engines in the ship, the gas to be supplied by a system somewhat resembling that of a city gas works.

IT is said that the Bucks County Public Service Corporation has commenced construction work on the proposed gas plant owned by the Langhorne (Pa.) Gas Company.

THE Massachusetts Board of Gas and Electric Light Commissioners has assented to an issue of 300 shares of the stock of the Beverly Gas and Electric Company, at par, to be exchanged on the basis of one share of the Beverly Company for two shares of the Danvers Gas Light Company; and the consolidation of the Companies is approved also. In addition, 1,216 shares of new Beverly stock may be issued at $170 per share, the proceeds of 69 shares to retire 118 special shares now outstanding; the proceeds of 1,147 shares to pay for additions made to the plant subsequent to January, 1911.

THE New Jersey Board of Public Utility Commissioners has employed the firm of Forstall & Robison to act as experts in respect of the investigation of the rates being charged by the Public Service Gas Company. Messrs. Forstall & Robison will work with the engineers of the Board in making a valuation of the properties of the Company in what is known as the Passaic zone, or the first branch of the Company's territory that will be investigated.

ADVICES from far-away Calgary, by way of Chicago, are to the effect that early in September, at Bow Island, Alberta, some drillers in the gas field struck a volume-flow which it is asserted eclipses any other flow ever known on the American Continent. The outpouring was measured by an expert who declared that, under a most conservative estimate exceeded 29 millions cubic feet in 24 hours.

AN odd story or narrative, from Lincoln, Ills., is to the effect that some days ago Miss Lydia Rhinehardt, a member of one of Lincoln's best known families, came to her death through an overinhalation of illuminating gas. She had, it seems, been in the habit of inhaling gas for the alleviation of some sort of stomach trouble, hence her death was attributed to accidental cause.

The Market for Gas Securities.

The "Morocco" situation, the "attack" of the Governors on the light and airy way with which a certain high court interferes with "State rights," the refusal of the "play censor of New York" to sanction the "Beulah Binford" stage appearances, and a few other trifles germane to the manufacture and sale of gas in New York city, may have been the cause or causes that led to a good slump in quotable values for Consolidated last week. A quotation of "under 30" was at one time recorded, but a partial return to reason brought about a partial advance in values. To-day (Friday) the opening in it was 132½ to 133. The business of the Company never was greater; its outlook never was clearer or brighter.

Brooklyn Union, too, felt the influence. It dropped from 135 to 129, and reacted to 131–132. Somebody seems to have at last realized the value of Laclede preferred, which we quote at 114 to 120. Peoples gas is steady, and the gas bond market is good.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

SEPTEMBER 18.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	132½	133
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	2,000,000	1,000	103	105
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	8,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	51	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	131	132
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅝	⅛
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,036,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	106	106½
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	88	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	101¾	102¾
Preferred	2,500,006	100	114	120
Bonds	10,000,000	1,000	102¼	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91	91½
Preferred	25,000,000	100	96	93½
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	5,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	103	103
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	108
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,800,000	200	448	450
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 18, 19, 20, 21, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ———— Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Oct 6, 1911. New York City. Officers: President, M. J. Brayton, Utica, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. 25, 26, 27, 1911, Chicago, Ills. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 26 West 39th street. New England, Secretary, W. S. Farrow, 1200 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, S. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Clinton, Ia. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, October 23-28, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912; Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Pacific Coast Gas Association.—Annual meeting, Sept. 19, 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers, President, C. W. Butterworth, Millon, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 39th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers, President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, April 27, 28, 29, 1912; Houston, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.